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Editor: Douglas G. Woolf

PROGRESS IN RAYON *Despite Deficiencies*

DEVELOPMENTS in the synthetic fiber industry have necessitated rather caustic comment many times in the past. Even this year, when volume of sales has increased and prices have been stable, it is not possible to avoid a critical attitude when analyzing the fundamental situation. The remarkable susceptibility of this industry to human control—not only in production but in distribution—makes failure to exert that control particularly culpable.

Nevertheless, in the consideration of these short-comings, the progress being made in many directions should not be ignored.

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There have been numerous indications this year that synthetic fiber manufacture is still a young industry—not only in years, but in alertness.

One such sign has been the development of new outlets. There has been no tendency to sell yarn only for those uses which have become established. Manufacturers have been searching for new fields—and have found many of them.

Promotional activities of individual producers have also reflected an aggressiveness which promises well for the future. Merchandising methods have in fact been far more progressive than have fundamental merchandising policies.

More important still, in our opinion, has been the development in technical research. Instead of regarding the 1931 fiber as the final product, subject only to minor improvements and modifications, certain producers have been conducting experiments, the results of which may eventually revolutionize present-day technique. Many of the new raw materials and new processes studied will be discarded; others will undoubtedly be gradually adopted to full commercial utilization.

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It is this phase which particularly interests us. And it is this phase which requires an economically sound structure for its maintenance. It was on this basis that we urged, in last year's Rayon Number, fundamental stabilization of the industry primarily as protection for its research.

It is still on this basis that we express the hope that the next year will witness such stabilization.

Fortunately, there are signs which indicate that this hope may almost be expressed as a belief. Inter-company relations, it is said, are improving steadily; antagonisms are less acute. If this attitude can be developed to a point where the industry will be able to withstand the next crisis, with less demoralization than characterized the last, real progress will have been made.

Rayon Industry

Enjoys Profitless Prosperity

By Douglas G. Woolf
Editor, TEXTILE WORLD

BY THE end of 1931, the rayon industry will have made a lot of yarn and very little money. That, briefly, is the story of the year in synthetic fibers.

If the production estimates for 1931 submitted to us by most of the companies, and those which we estimated unofficially, should materialize, the twelve-month output of domestic plants would be slightly over 80% of capacity, of which about half was realized prior to July 31 and the balance is expected to be produced during the last five months of the year.

In view of the facts that this would represent a 35½% increase over 1930, and that a production rate of only 65% of capacity was predicted at the beginning of the year, the figures are impressive.

Specifically, the 1931 output, estimated on the basis outlined above, would be 161,165,000 lb., as against 119,000,000 lb. in 1930.

Unfortunately, however, there are many questionable factors involved in this estimate. In the first place, as indicated previously, certain producers continued to display the reticence which developed last year, and did not supply the desired information. Although they were in the minority, their aggregate production is a factor. Furthermore, a study of the figures received indicates that in some cases the wish may be father to the thought, and that estimates for the balance of 1931 may have been figured on the most optimistic basis, and that possibly the very difficult feat of operating at 100% theoretical capacity was assumed as accomplished.

Consequently we regretfully omit from this issue the table of estimates by individual companies because we hesitate to print figures which may be materially at variance with the output actually realized. We have, however, included the 1931 estimate in our chart of United States and world production, subject to revision when more facts are available after the end of the year.

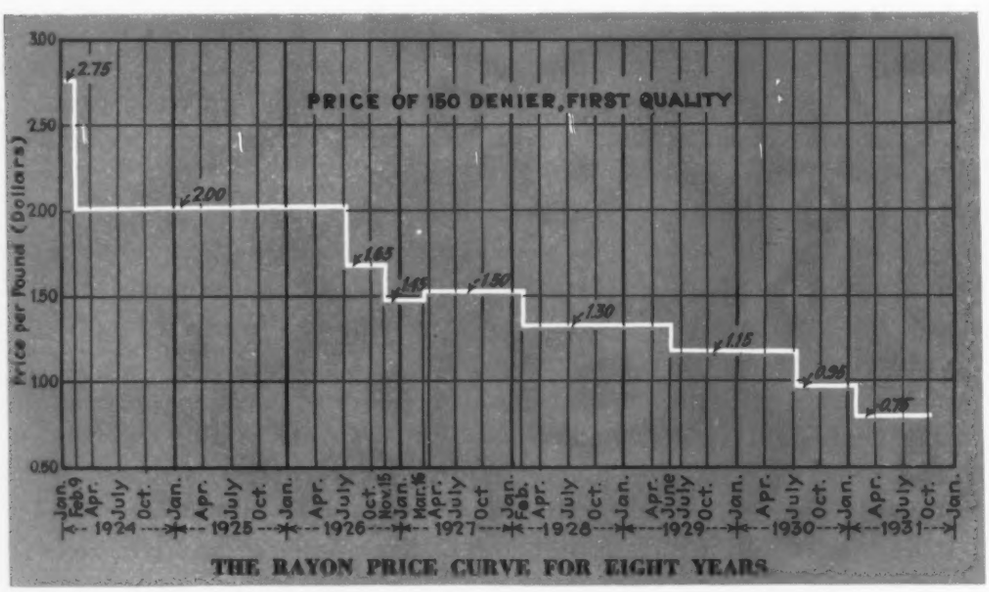
Nor do we feel it possible to express, with any assurance of accuracy, an opinion as to the extent to which the output may fall short of the estimate of 161,165,000 lb. A figure of 128,000,000 lb. has been published elsewhere. This, we believe, is low. We should certainly be surprised if 1931 production fell below 140,000,000 lb. However, it can be realized that the spread between these figures is so wide as to make a forecaster more than usually wary.

When it comes to 1932, the business of predicting is naturally even more complicated. Estimates we have on hand show a total of 194,140,000 lb. This is an assumption of operation at practically full theoretical capacity. It will be seen at once that there are too many "ifs" in the situation to permit that figure being advanced as anything but an interesting speculation.

However, forgetting the details of this rather intricate statistical situation, the fact remains that the rayon industry snapped back, so far as sales and production were concerned, in remarkable fashion. After losing ground in the output curve in 1930 for the first time since the beginning of the impetus, it has again set a new record for volume.

It would be gratifying if the increased volume of sales could be recorded as the result of masterful merchandising on the part of the industry. Unfortunately, such is not the case. It is true that certain constructive moves were undertaken, particularly in connection with rebates and guarantees, but the major problem confronting the industry has not been solved; it has merely been sidetracked temporarily. This problem requires rather thorough analysis.

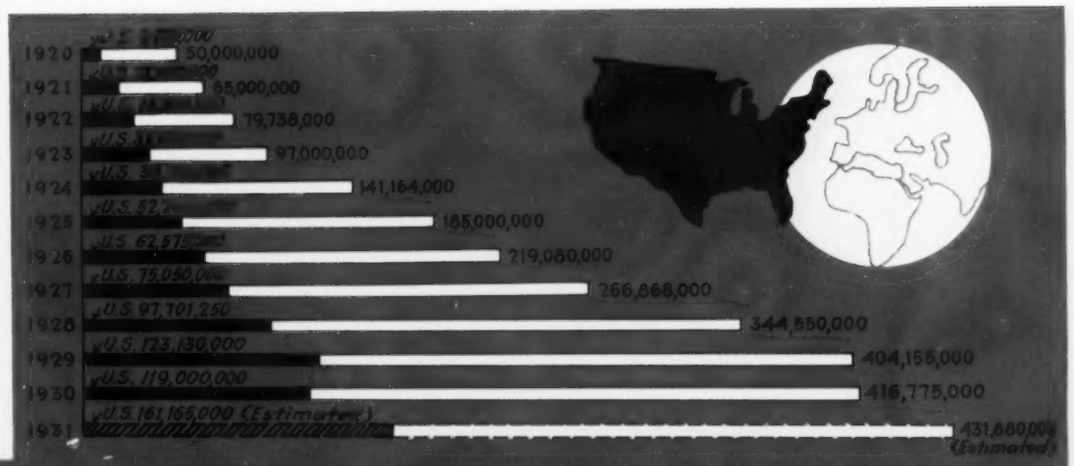
At the beginning of the year, a state of war existed in synthetic fibers. Price-cutting and unintelligent production schedules during 1930, in the face of depressed demand, culminated in January in official reductions of list quotations to a basis of 75c. for 150-denier viscose rayon.



THE RAYON PRICE CURVE FOR EIGHT YEARS

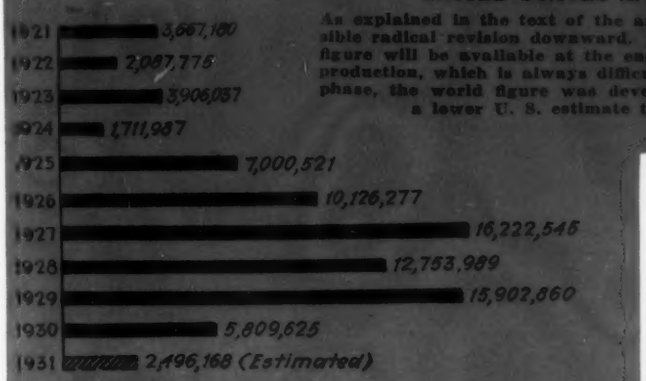
For a month or two, complete demoralization ruled in the industry.

Then textile business began to improve. The synthetic fiber industry got its share of this; in addition, the low price added an extra stimulus. As a result, plants began to operate at 100% capacity, and



UNITED STATES AND WORLD RAYON PRODUCTION BY YEARS

As explained in the text of the article, the estimate of 1931 U. S. production is subject to possible radical revision downward. It is used in this chart merely tentatively. A more accurate figure will be available at the end of the year. The same remark applies, of course, to world production, which is always difficult to estimate; in addition, as explained in the article on this phase, the world figure was developed by our Manchester (Eng.) correspondent and includes a lower U. S. estimate than that given separately in the above chart.—*Editor.*



RAYON YARN IMPORTS BY YEARS

talk of possible shortage was heard. [This talk, however, is not to be taken too seriously, except in certain specialized grades.]

Temporarily, the price war was off. When there is ample business in sight for all firms, an armistice is the only logical development.

But it *is* only an armistice. There is no evidence available which gives any assurance that viscose firms with small production can break even on current prices; or that the larger companies, even when running full, can make any money. Costs are naturally susceptible to continued reduction, but the best data that can be secured indicate that 75c, or not much under, is about a normal cost figure today, *providing* depreciation and research charges are taken into consideration.

On this basis, it does not seem likely that the industry can continue indefinitely without some radical change. While business is at hand, as we indicated above, there is not the impetus toward effecting that change. In fact, if the duration of the activity were prolonged considerably, there would be reason to anticipate price advances which, temporarily at least, would place synthetic fiber manufacture on a sounder basis. But, at the approach of a period of low demand, the old story would be repeated. In view of the lack of cooperation among members of the industry, it would be safe to expect, under those conditions, another epidemic of price-cutting, unwarranted production schedules, and general disorganization.

Consequently the industry still faces the need of some type of centralization—in the form either of a cooperative movement or of actual corporate mergers. The former was tried, with some success at the start, but eventually met failure. It could be tried again.

The merger remedy was imminent earlier in the year and negotiations were under way toward its realization. Delayed at first by inter-company disagreements, it was later postponed indefinitely, partly because of the new rate of activity.

It still appears that one of these two methods will eventually have to be adopted, unless the outcome is to be left to the tender mercies of the law of "survival of the fittest," with its attendant suffering for capital and labor.

Increased Consumption Likely?

All of this may sound unnecessarily gloomy in the face of unexpected improvement in business. Unfortunately, however, it is impossible—or at least unwise—to forget fundamentals in the excitement of temporary movements, whether up or down.

There *is* one bright spot which deserves emphasis.

The so-called "saturation point" in synthetic fibers has not been discovered—nor will it soon be discovered.

In spite of constantly recurring crises, the broad onward march of rayon is progressing. The man-made fibers are constantly finding new and extended uses. If it was difficult five years ago to set a limit to their consumption, it is even more difficult today in view of the many predicted "stopping-points" which have been reached and passed.

Consequently, no matter how discouraging the inability of the industry to correct merchandising faults may be, there is every reason to be encouraged about the ultimate future of synthetic fibers. They will suffer further setbacks, but they will realize new achievements.

As to the immediate future, the possibility of increased, or even maintained, volume of business depends very largely upon the extent to which revival of general business develops to support the present stimulated rate of activity in textiles. Such general support might very possibly push rayon prices above present levels. However, indications at present do not afford too much hope for any immediate general improvement.

It is, of course, far more pleasant to record the developments of 1931 than 1930. Business has been done; workers have been employed.

It will be still more pleasant when it is possible to record the developments of a year when the industry's house has been completely set in order.

World Rayon Output for 1931 *Estimated at 431,880,000 lb.*

From TEXTILE WORLD'S *Manchester (Eng.) Rayon Correspondent*

Estimated Production of Rayon Yarn by Countries and Processes and Estimated Consumption—1931

(In thousands of lbs.)

Country	Viscose	Acetate	Cupra.	Collodion	Total Production	Consumption
Belgium	8,400	840	.....	.....	9,240	5,280
Great Britain	39,160	8,470	330	.....	47,960	41,800
France	28,600	6,160	660	.....	35,420	17,160
Germany	43,120	3,080	6,600	.....	52,800	67,100
Holland	21,120	.....	.....	.....	21,120	2,420
Italy	60,720	3,850	1,430	.....	66,000	22,000
Japan	48,070	.....	330	.....	48,400	44,000
Switzerland	8,360	330	.....	.....	8,690	3,190
United States	101,200	14,300	2,200	5,300	123,000	147,000
Canada	5,060	2,640	.....	.....	7,700	78,650
Czecho-Slovakia	3,520	.....	.....	.....	3,520	
Poland	4,840	.....	.....	440	5,280	
Others	2,750	.....	.....	.....	2,750	
Total	374,920	39,670	11,550	5,740	431,880	428,600

◆ *The difficulty of estimating 1931 U. S. rayon production, noted in the preceding article, complicates the presentation of world figures. In the accompanying article, the Manchester (Eng.) rayon correspondent of* TEXTILE WORLD *estimates 1931 output for the world and includes a figure of only 123,000,000 lb. for the United States. Usually his estimate and our own are so close as to permit the slight adjustment necessary to make the two check. However, in view of the wide discrepancy this year, and because of the difficulty of selecting either figure with any assurance of accuracy, we have made no change in our correspondent's estimate, thus permitting his article to stand by itself as the expression of his opinion.*—Editor.

PRELIMINARY estimates of world rayon production during 1931 indicate a total of 431,880,000 lb., which is somewhat in excess of the generally accepted figures for 1930. While there has been a considerable falling off in certain of the European countries due to a more rationalized state of affairs, this has been more than balanced by an increased demand in certain directions.

Apart from the United States, where trade has shown considerable improvement, there has been unabated headway made in Japan, and Canada is now rapidly becoming an increasingly important producer of rayon yarn.

The table shows the estimated production this year by the various processes. Perhaps the most interesting feature is the headway being made by acetate. At one time it seemed not at all unlikely that the claims of the companies producing by this process were exaggerated and indeed even now there is no sign of viscose being displaced. Nevertheless acetate production is growing in all countries where a reasonably high standard of fabric is required. Competition with viscose is very keen, however, and moreover there are indications that the producers of cuprammonium rayon are taking steps to meet the competition of acetate.

The production by the cuprammonium process has during the last year or two suffered considerably from the price of the finished yarn but with a lower level, the course of demand may be considerably changed. The output of nitro-cellulose yarn has been almost entirely suspended in Europe and the world total is therefore comparatively small.

In general it may be said that the European percentage of the total world rayon output is now considerably less than it formerly was. In fact, in the current year it is expected that Europe will not account for more than about 59%, whereas Asia, which in 1929 accounted for only 7%, is expected to reach 11%. Viscose is holding its own and this year accounts for approximately 88% of the world total. Acetate is forging ahead with 9% against only 6% in 1929 while cuprammonium with 2% and nitro-cellulose with 1% show decreases.

In the last column of the table are shown the estimates of world consumption during the current year. Despite the progress made in the United States and also in certain other countries, there is no indication yet that the industry is fully rationalized and that surplus output has been stopped. It is true that by sacrificing price, certain of the European countries have carried on an increased export trade, but there is no clear indication that these yarns have gone entirely into consumption.

The European countries such as Italy and Belgium have suffered considerably from Japanese competition both on account of the lessened demand throughout the East for yarns and the smaller call from weavers at home who normally deal in a big way with India and China. Combined with the particular difficulties of the industry itself, rayon has had to contend with the low prices of competitive textiles and with the serious financial position now affecting every market in the world.

Great Britain has trusted more and more to her home market. Actually the consumption in Britain itself has been higher this summer than at any previous time. Her export trade has dwindled away and while this undoubtedly means that her strongest producers have kept out of the cut-throat competition, it means a loss of business which it will be very difficult to regain.

Europe *Considers Fields of Expansion in Rayon Use*

By J. Guthrie Oliver

IN a period in which demand for textiles has reached a very low ebb, consumption of rayon has been remarkably well maintained, and has in fact materially increased in proportion to the total textile trade. This statement certainly applies in Germany and Britain, and it has been the tendency in European countries generally. The first reason which could be put forward to account for this development is of course that rayon is comparatively undeveloped and still finding new outlets to make up for the decline in business generally. The price of rayon continues to fall, and at the same time quality improves.

One very important development of the last twelve months has been the progress made with non-crush fabrics. This time last year the only cloths which could be guaranteed non-crushable, apart from velvets, were special cotton-and-rayon crepes of fairly high quality, made with a hard twist two-ply Egyptian crepe warp and a fine-filament acetate filling. The cheaper-quality fabrics made on similar lines are now virtually non-crushable; and, more recently, all-rayon crepes and taffetas have been produced in qualities which can be so guaranteed.

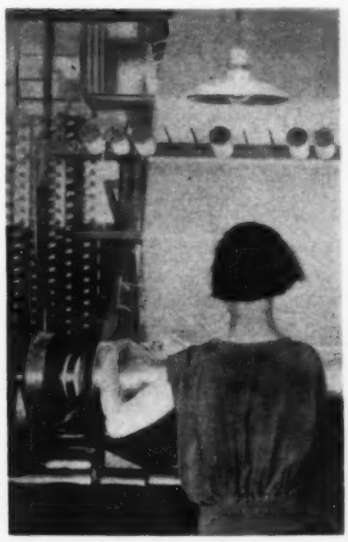
Last year we mentioned "Agfa-Travis" and "Lilienfeld" strong yarns as likely to come much more into prominence. It has been found, however, that fabrics made from yarns of ordinary strength have met present-day requirements so far as strength is concerned, and manufacturers have not been willing to pay the price of the higher-strength yarns. True, these yarns have met with a certain amount of success for knit wear in Germany, but demand has not come up to expectations despite the fact that garments which are virtually untearable can be produced.

Various firms are now trying out poplins in rayon for the shirting trade made in two-ply viscose yarns; and if successful shrinking is carried out, there is no reason why these should not become popular. They have, of course, an indescribable intrinsic charm, which is, in the opinion of the writer, the most important factor in rayon development. Two-ply 75-denier medium-fine-filament viscose (18 filaments in 75 denier) is the yarn to be tried out so far; and though price is still rather on the high side, if demand stands a reasonable chance of expansion, the cost will certainly be remedied by the leading viscose firm.

A two-ply warp and singles filling is one of the new constructions for both dress and furnishing fabrics. Some time ago a Manchester firm introduced a plain-weave dress fabric which is non-crushable. It has a two-ply spun-viscose yarn and fine-filament acetate filling, and has been among the successful lines of the last season.

One of the most interesting developments in the last twelve months or so has been the big increase in demand for rayon in the warp, and some of the most successful fabrics have been constructed with rayon in the warp and a filling of cotton or worsted. This development, which is a complete change around from the old idea, is largely due to the rapid improvement in the preparation of rayon warps. It really originated in the lining trade, but has since spread to dress, lingerie, corset, and furnishing fabrics. The rayon-warp fabric is, generally speaking, firmer and more serviceable than the cotton-warp rayon filling construction.

Last year we referred to rayon terry towelings, made possible by an improved form of warp-pile control; and these have met with considerable success. On account of their attractive appearance and softness of handle for the delicate skin, they are likely to continue in popularity. Another development of rayon in the toweling trade has been the production of towelings with a spun-rayon pile; and these have a charming appearance similar to that produced with continuous-filament rayon; furthermore, they do not make necessary the special loom attachment to render their production possible.



The year 1931 has seen the introduction of the first British-made umbrella fabrics, though these have been made in Europe for some considerable time. The British manufacturers have produced an article, however, guaranteed to have a non-slipping selvage which resists cracking or splitting. Rayon shoe fabrics are now an established fact both in Britain and on the Continent.

Rayon sheetings have as yet met with very little success on account of their high price, but this is certainly an outlet which offers a wide future scope. There have been various attempts to introduce blankets made from rayon waste, and these have a delightful handle and a soft, attractive appearance. Manufacturers have met with some success with these goods on the Continent, but so far the British public has proved to be too conservative to be persuaded to take them up.

The past twelve months has seen something of a set-back for rayon in the hosiery trade, due to the popularity of the full-fashioned stocking and the low price of real silk. Britain has of course followed the United States in adopting rayon as a material for men's underwear. The lace trade is more than ever a rayon trade and likely to remain so.

RAYON *and Other Synthetic Yarns*

Shower bath curtains, not rubberized, but made water-repellent —DuPont Rayon Co.

Panne satin gown and Velvocel wrap—Celanese Corp.

Decorative wall hanging of lustrous radium in pastel shades —American Bemberg Corp.

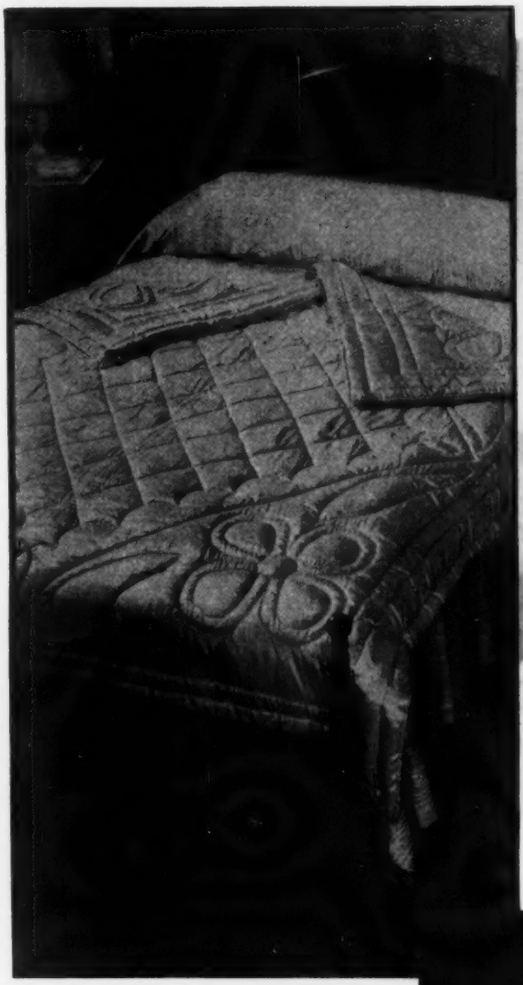
Latest type mesh hosiery made of Chardonize—Tubize Chatillon Corp.

All-over lace bedspread in attractive floral pattern—American Enka Corp.

Novelty shoe laces offered in Cellophane package —American Bemberg Corp.

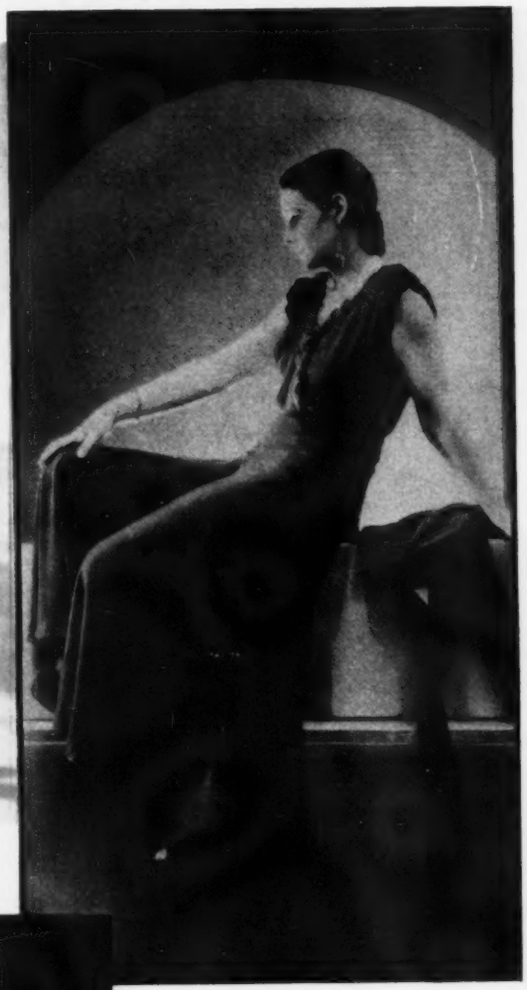
Wall paper with fabric face in distinctive tapestry effect — Viscose Co.

Find Uses in Ever-Expanding Fields

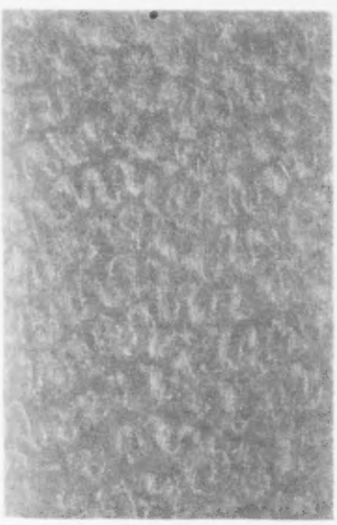


Taffeta-covered comfortable with pleasing quilted clover pattern —Viscose Co.

Bathing suit of Chaeelon — Tubize Chatillon Corp.



Red transparent-velvet formal pajamas with jacket, in current mode—Viscose Co.



Imitation Persian lamb, with rubber backing for pelt effect by S. Blumenthal & Co.

Office coats as well as coat linings are offered in twill weave of Celanese

Taffeta unbrella, color fast and water proof —American Bemberg Corp.

Violin bow strung with synthetic yarn, a novelty — American Bemberg Corp.

Producers Plan

Merchandising Program

For 1932

By John Black
Assistant Editor, TEXTILE WORLD

WITH numerous producers backward in deliveries, and with the industry as a whole setting new records for volume turnover, it may appear a bit superfluous to discuss promotional and merchandising problems in the rayon industry. However, we must stand on the peak of the mountain and gaze down the other side. Far-sighted rayon companies recognize that the trade is now enjoying an inflated demand and they are planning their promotional programs for 1932, quite irrespective of the current boom. Already certain significant merchandising trends for the coming year are evident, and these deserve close analysis.

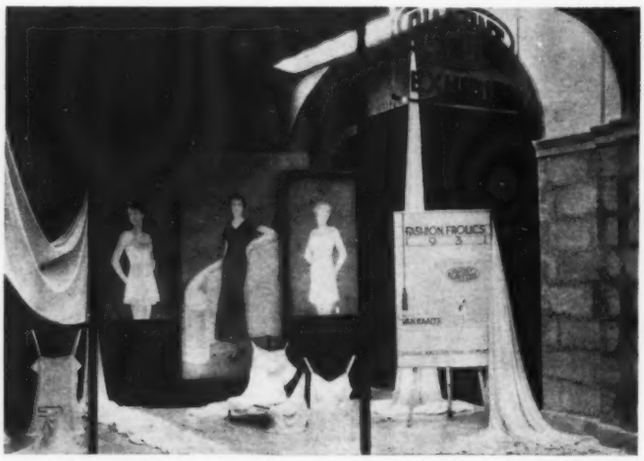
Let us take advertising first. It has long been a moot question among rayon producers as to whether they should concentrate on trade or consumer advertising. The prospects are that during 1932 there will be active promotion in both mediums, with the trade journal as the chief instrument. It is significant that, during the fall months at least one important producer, not hitherto an extensive advertiser in consumer publications, has taken space in some of the foremost style magazines.

The reasons for this departure follow: This rayon company is not interested in making the names of its yarn a by-word to consumers by means of costly publicity; the company chose the style magazines because these publications are read by style authorities and thus serve to build prestige for certain brands of rayon yarn, as adaptable to current fabric fashions. In other words, the style magazine really functions as a trade medium.

But, while they intend to accent trade promotion, rayon companies do not lose sight of the ultimate consumer, and the coming year will see concerted effort toward building style acceptance for rayon, both by prestige promotion in the trade, and by direct appeal to the consumer. To sell itself to the consumer, rayon has first to lay foundations in the fabric and garment industries. The merchandise must be available before advertising either to the store or to the store's customer. Thus, two promotional approaches face the rayon industry: first, trade acceptance, in which field a spirited and expert job will be done during 1932; second, the department store and the consumer. Rayon selling executives tend more and more to vertical merchandising, and to following the movement of their yarns through to the ultimate wearer of the garment.

There is a sharp division in the rayon industry as regards the advisability of spending huge sums in consumer advertising. One viewpoint, representative enough to warrant attention, is that too much consumer appeal leads to waste. With the present tendency toward mixing rayon yarns it is difficult to identify one particular yarn in the fabric, and even more difficult to identify it in the garment. Let us quote the vice-president of a leading rayon company: "There is a tendency to overdo the promotion of a name, and we must be careful, as vast sums of money are involved, and it is easy to become reckless in consumer promotion."

Another producer takes the attitude that his business is fundamentally a yarn business. His firm spent many years in building up a demand for yarn among knitters and weavers. It emphasized quality and service. The company went to great lengths in helping new mills to develop, thus winning them as permanent customers. This policy is very significant as it brings up the vital question of whether rayon companies should control their yarn outlets, either in the weaving or knitting fields. The current year has seen several important steps in that direction, notably the announcement by the Industrial Rayon Corp., that it would begin knitted underwear fabric manufacture.



Du Pont exhibit featuring Van Raalte products

A surprising number of rayon firms are sympathetic to this idea, though they hesitate about going so far. It is important, they contend, that the yarn producer should have the closest possible contact with the weaver and knitter, and some add, "even to the point of having mills practically as subsidiaries"; but they believe this should be done chiefly from the service point of view, and they regard the idea of actually manufacturing fabrics as bad policy.

Servicing of customers was an outstanding development of rayon promotion during 1931, and it promises to be even more important next year. This of course is paramount as a means of preventing a trade-down

Typical advertisements by rayon companies

A cutting from Viscose Co's. educational movie

tendency. Producers are keenly alert to the importance of maintaining quality in the finished product. The "Quality Control Plan," initiated so successfully last year by the Viscose Co., is only an expression of a growing feeling throughout the industry. The very satisfactory results following the common sense application of that plan during 1931, have convinced the producers of the need for watching what happens to their yarn in the mill.

Now they are making a quiet but firm effort to keep the rayon product on a good level of quality. Even without the splendid machine organization that Viscose has built up, other producers find they can get results. They exercise close scrutiny of merchandise produced by their customers; if the product is below the desired level of quality, then the customer is quietly dropped. This is done unobtrusively, of course, and it serves the desired purpose of protecting the name of the yarn. Producers encourage the use of their yarn names on finished goods, by means of labels, etc. The current year has seen a veritable flood of new brand names for rayon yarns, and already these are being exploited in such articles as stockings, underwear, etc.

The service departments of the rayon companies have developed greatly during the year, and their scope has broadened to the point where the producers will spend large sums in advising mills on questions of fundamental policy and methods of production. On one occasion this year, a rayon firm sent technicians to a mill site and gave the service of these men for days in selecting mill equipment, building organization, shaping plans for dyeing, bleaching, etc., and even offered suggestions on financing. The laboratory service staffs of the major companies today average 15 to 20 employees.

Consideration of merchandising in its broader aspects brings us to two related issues: trade cooperation, and diversification of product. So far as outward manifestations are concerned, trade cooperation seems to be in rather a sorry state, especially as regards the trade associations, now virtually defunct. Beneath the surface, however, one finds a steady growth of cooperative spirit which, while unorganized and informal, promises well for the revival of the trade organizations later. Cooperation in the rayon industry is growing, rather than lessening, despite outward signs to the contrary. Indeed, several far-sighted executives in the industry see possibilities for a new and aggressive rayon trade association about eighteen months hence. One significant suggestion, made to the writer, involves the organization of a body which would embrace not only rayon producers, but also rayon consumers—weavers, knitters, converters and other manufacturers. This idea is well worth considering as such an organization, when properly built up, would have great force throughout the industry. The body as visualized would be somewhat analogous to the Silk Association of America.

It is clear that rayon producers are far from eager to emulate the policy some companies have adopted of producing fabrics. This question of diversification of product came to the front during the current year, when the cellulose acetate field was increased to five companies. While the producers have not closed their minds on the proposition, they are reluctant to enter the fabric industry, beyond what may be needed as service to customers. There is a feeling that it is bad to get into both ends of the industry; that a company is just as apt to lose as to gain money by this move. Despite the success which has attended certain ventures along this line, indications are that this policy of making fabrics will not be adopted by the industry as a whole for some time, at least.

Year's Technical Developments *in Rayon Manufacture*

By Harold DeWitt Smith
Ch.E., Ph.D., A.T.I.
Of A. M. Tenney Associates, New York

THE following summary of the developments which have taken place during the past twelve months in the technique of rayon manufacture is based, as was last year's review, on the writer's observations and opinions as gathered from the literature and from personal contacts and experience. No attempt is made, therefore, to quote sources, except in one or two instances where actual figures or facts are used.

The year has furnished few evidences of any startling technical developments; or perhaps it would be more accurate to say that, of the interesting developments which are under way at the present time, some of the most significant are not yet available for publication.

The continuation of weakness in prices during the last part of 1930, which was followed by a further cut in the early part of 1931, has unquestionably intensified the previously noted search for improvements in processes and machinery in order to reduce costs and rationalize the manufacturing process as far as possible. At the same time, because of the temporary excess of productive capacity, very little construction work on new plants has been undertaken during the year: hence there has been less opportunity than usual to install and try out some of the newer developments in machinery which were reported last year.

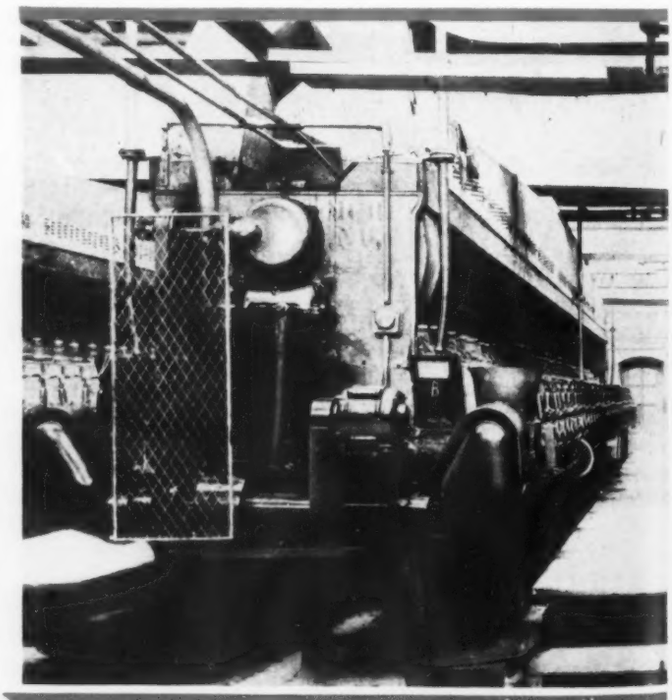
In the field of raw materials there has been no indication of any appreciable progress on the part of substitutes for wood pulp and cotton linters. It is said that the experiments on the manufacture of a bleached pulp from southern pine suitable for fine paper and rayon are making headway. A firm has been formed in New Hampshire during the year for the purpose of developing China grass, which grows well in that region, for use as a textile fiber and perhaps as a rayon raw material.

Of the four commercial processes, the viscose still predominates. The preference for the bobbin-spinning method, using large bobbins, seems to be quite definitely established. The gear pump seems to be gaining in popularity over the piston-type pump. The mechanism for automatically changing from a full to an empty spinning bobbin would seem capable of further mechanical improvement.

An example of the attempts being made to simplify the manufacturing process is a German patent which claims to produce, by the addition of a small quantity of sulfonated fatty oil to the viscose solution, a clear viscose after a single filtration. Improved strength of the yarn is also claimed.

Little has been heard of the attempts to complete the after-treatment of viscose yarn on the spinning bobbins, as exemplified by the English Brandwood process. After-treatment of pot-spun yarn in the cake, however, has apparently been accomplished by the Breda Co., in Holland, which exhibited at the Leipzig Spring Fair a form of package called a "Spulkranz." This is a cake from the spinning pot which has been bleached and desulfurized in that form. A patented reel is provided so that the cake can be handled on any ordinary winder. It is claimed that this method of manufacture, which eliminates all handling in skein form, has increased the percentage production of first-quality yarn, reduced winding costs, and increased winding production. Courtaulds, in England, has also patented a method of supporting the spun cake on three rods and passing it through a drip-washing process.

No evidence has appeared that the Lilienfeld process is nearer to success than before. In Germany, however, both the I. G. Farbenindustrie and the Vereinigte Glanzstoff, A. G., have produced products (called respectively Tramyl and Sedura) which are designated as washable super-viscose yarns. The Sedura is claimed to have five times the wet strength and three times the dry strength of ordinary viscose and to combine this remarkable strength with a soft hand and a lustrous appearance. The prices of both types are too high to make them serious competitors of other rayons as yet.



Spinning machines in large

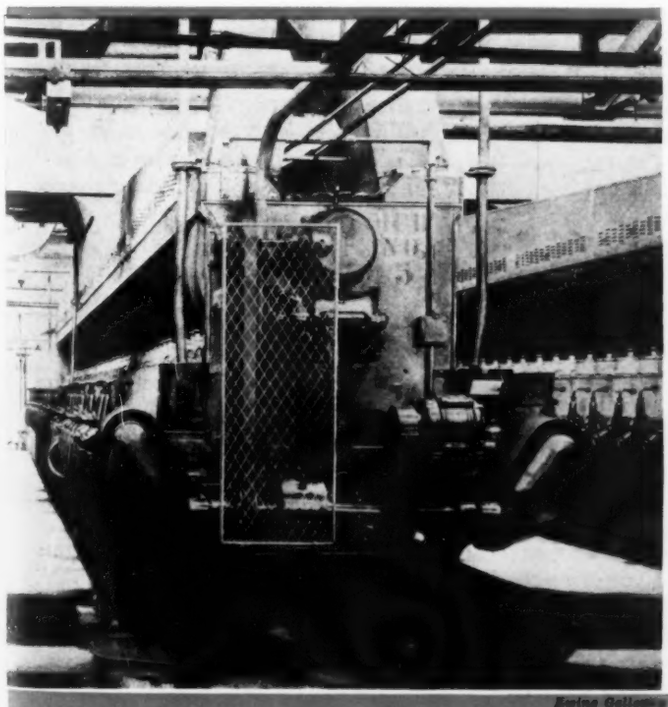
The acetate process continues to gain in importance more rapidly than any of the other three. A new plant for its manufacture is nearing completion in this country.

The literature is full of references to patents and discussions of the technology of raw-acetate manufacture. The question of synthetic versus the older methods of producing acetic acid and related products, which was raised in last year's review, has been summed up by Everett P. Partridge, in *Industrial and Engineering Chemistry*. In an excellent survey of the acetic-acid and cellulose-acetate industries, this writer expresses the opinion that in the United States the facts that the wood-distillation process is so firmly established and that the cost of production by this method is so close to that of the synthetic method which uses acetylene that the latter process will make very slow progress for some time. He considers the synthetic method which starts with ethylene and proceeds via the oxidation of ethanol as more competitive from an economic standpoint, since its costs are considerably lower.

Various processes of acetylating cotton which differ from the "classic" procedure have been discussed. All of them are designed to simplify and reduce costs. In this connection, the use of liquid sulfur dioxide as a solvent for the primary acetate, instead of glacial acetic acid, has been called the greatest development in cellulose-acetate manufacture since the work of Cross and Bevan. Another method, for which greater economy is also claimed, is acetylation by means of ketone in a neutral organic solvent in the presence of zinc chloride.

As for the spinning itself, the dry process still holds the center of the stage, despite occasional patents for wet spinning and a rather persistent recurrence of discussions of wet-spinning methods in the foreign press. There are said to be two acetate concerns in Europe using a wet-spinning process.

Dry-spinning patents include one for spinning into a centrifuge, similar to the viscose pot system, and several on accomplishing a stretch spinning in the dry process by such means as the introduction into the spinning chamber of the vapor of a swelling agent in order to keep the thread in a plastic state while being stretched.



rayon manufacturing plant Ewing Galloway

The nitrocellulose process is enjoying continued success in this country with the dull-luster yarns which enabled it to retain its place last year. Elsewhere it appears to be practically extinct. This process of producing matte yarns is at present the subject of several lawsuits, the outcome of which should clarify the situation as to authorship and ownership as well as of the "airtightness" of the patents involved in the yarn production.

With the decline in the price of viscose yarns, the price of cuprammonium yarns has also been reduced considerably, thus opening fields which were heretofore closed to this type. In this country quantity production of cuprammonium yarns is still confined to one company. In Europe this type of yarn has met keen competition during the past year from fine-filament viscose yarns of the Travis type. Unquestionably manufacturers both here and abroad are making every effort to reduce costs and rationalize their processes.

The popularity of subdued and dull-luster yarns continues. During the year the demand for viscose yarns on the part of circular and flat knitters and hosiery mills has swung almost entirely away from the bright yarns.

Dull-luster acetate yarn has made its appearance during the year. This development has not assumed such importance, however, because of the ease with which the luster of acetate fabrics can be modified in finishing process.

The trend toward finer filaments has continued. A comparison of the tables of yarn types manufactured in the United States as published by Cox, Fuller and Mauersberger in July, 1930, and March, 1931, shows that in five instances the filament structure of a yarn has been increased and in no case has it been reduced.

It is interesting to note also that, contrary to general belief, no simplification or reduction in the total variety of deniers and filament structures has occurred, according to these tables. In both, 29 separate deniers are listed with a total of 140 different yarns. Sixteen of the yarns which were listed a year ago have been discontinued, and an equal number of new ones has appeared. The tendency seems to be for the larger producers to simplify their manufacturing program somewhat, and for the smaller ones to amplify theirs by the addition of new numbers.

The putting up of yarn in the package forms desired by the consumer has become more and more universal in this country, thus eliminating the outside processing or preliminary handling in the mill. This movement includes even the high-twist yarns to some extent.

In addition to spools, cops, and skeins for the weaver, and cones for the knitter, the use of warping cones especially prepared with "tails" of yarn at the base for use on magazine creels is increasing; and parallel tubes or cheeses are also gaining in popularity among the weavers. Larger skeins have been developed and their use made practicable by the development of modern winders equipped with automatic stop motions.

In England it is reported that two-ply yarns are being developed because of the lower price levels and the trend toward finer deniers which has resulted from the increasing competition among yarn manufacturers there.

One of the outstanding developments of the year has been the increasing interest in spun rayons, which have attained a rather sudden rise to popularity. This has resulted in an increased demand for staple fiber.

Developments in Viscose Rayon Center on

Improved Appearance

By A. J. Hall

FINANCING of research and experiments has been made difficult by drastic reductions in prices, both for rayon yarn and for dyeing and finishing fabrics containing rayon. It is evident, however, from the patent and scientific literature that rayon technologists have been very busy in spite of financial difficulty. It is doubtful, indeed, if any previous year has produced so many inventions relating to rayon.

Considerable effort has been made to improve the appearance and handle of viscose both by the rayon manufacturer and by the finisher of rayon goods. In many ways it is preferable for the manufacturer to do this, because it is obvious that the improved character of the yarn he produces will be of a permanent nature; it would scarcely be worth his while to modify his product if that modification disappeared during bleaching and dyeing.

At the moment, a good appearance in viscose rayon is essential. There is no doubt that apart from its softness of handle, cellulose acetate yarn owes much of its popularity to the fact that it can be easily delustered to yield a matt appearance. Unfortunately the luster of viscose cannot be so easily reduced by the finisher. For some time, however, a viscose rayon of the subdued-luster type has been manufactured by incorporation in the viscose spinning solution of fats and waxes; and this type of yarn retains its dull luster in subsequent processing. On the other hand, rayon yarns which owe their dull luster to the omission of the desulfuring process during manufacture are not altogether satisfactory, for during bleaching and prolonged soaping, the sulfur particles present are removed or oxidized, and the yarn gains in brightness.

One difficulty occurs in producing a dull-luster viscose yarn containing a fat or oil. Since these additions are water-insoluble, they tend to rise as a cream in the viscose solution during the period between their addition and spinning. The remedy consists of incorporating, with the delustrant, a stable emulsifying agent; and it is stated that stable agents of exceptional utility are obtained by dehydration of castor and olive oils. In a recent patent it is indicated that low-luster rayon is obtained without difficulty by adding to the viscose spinning solution a difficulty hydrolyzable ester of a hydrogenated phenol (for example, the methyl cyclo-hexanol esters of cinnamic acid, methyl adipic acid, and of fatty acids, such as oleic and palmitic acids).

Another patent describes the manufacture of dull viscose rayon by incorporating 1% of mono- or di-chlorbenzene in the spinning solution. Finally it may be noted that the addition of up to 0.5% of a cold water suspension of starch (not boiled starch) to viscose solution results in formation of rayon with reduced luster.

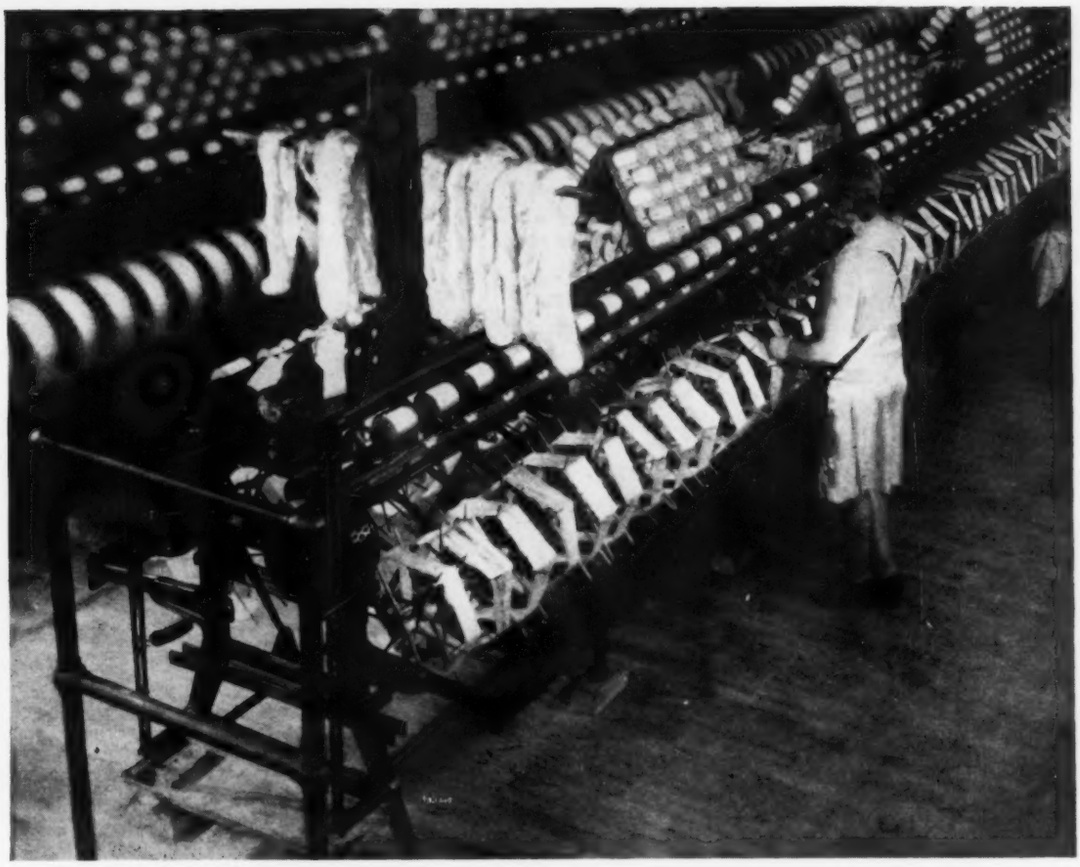
Improved Handle

Viscose rayon manufacturers do not appear to be making much progress in the production of rayon having the softness of cellulose acetate, except by the expedient of spinning very fine filaments. But this method is so effective that it is easy to distinguish a fine-filament (say 1-denier) material from one made from coarse filaments (say 3 denier) merely by handling it. *A priori*, it would not seem impossible to so modify the structure of the cellulose of a viscose rayon during the process of coagulation in spinning to give it softer properties; and research along these lines should be profitable.

But however much the manufacturer may improve his yarns, it is certain that the bleacher, dyer, and finisher will try to go one better—and in fairness it must be stated that he often succeeds. A large amount of research has been carried out by the finishing end of the industry during the past year. All dealing with the processing of rayon fabrics will find valuable a paper by Ridge, Parsons, and Corner (*J. Text. Inst.*, 1931, *22*, 117), which deals with the general characteristics of most of the important types of commercial rayons now available. One development of interest, for example, is a process in which fabrics composed wholly or in part of rayon are treated with steam at a pressure of approximately 15 lb. and at a temperature of about 213° F. The goods are then cooled and the steam is removed by forcing air through the fabric. This process is intended to impart a soft, mellow handle to the goods, and at the same time to cause the fibers to swell, thereby accentuating the weave and deepening and enriching the color.

It is difficult to dye and finish satisfactorily a rayon fabric which has not been woven or knitted correctly because its properties—such as affinity for dyes, softness, resistance to creasing and luster—are easily affected by any undue stretching which may occur in the production of the fabric. This feature has been discussed by the writer elsewhere (*J. Soc. Dyers and Col.*, 1930, *46*, 92), but more recently he has devised a simple test by which excessive stretching of viscose yarns may be detected in the fabric. The material is immersed for a few minutes in a nearly boiling solution containing 5 c.c. of a 20% solution of ferric sulfate, 10 c.c. of glycerin, 0 to 40 c.c. of 10% caustic soda solution, and water to make 100 c.c. The sample is then rinsed in cold water and finally is immersed for a few minutes in an acidified solution of potassium ferricyanide. Stretched yarns develop a blue color in proportion to the degree of stretching, and this effect is greater as the alkalinity of the reagent solution is increased.

As previously mentioned, cellulose acetate yarn is generally regarded as being nearer than viscose rayon to real silk as regards handle and luster. Therefore



Steady progress has been made in improving the appearance of rayon

most dyers and finishers of viscose fabrics are confronted with the problem of treating these so that they become equal to fabrics consisting of cellulose acetate, this latter being usually delustered. The great problem is to secure softness and a matt luster. It may be said in passing that dyeing difficulties have largely given place to difficulties in finishing; it is now seldom that manufactured goods contain varying qualities of viscose.

Delustered Finishes

A matt appearance is usually obtained by precipitation of insoluble inorganic substances within the rayon, for example, barium sulfate; subdued luster can also be secured by padding with Mulsoid and then drying. Quite a novel delustering process is that described in an English patent, in which magnesium silicofluoride is deposited within the rayon merely by raising the temperature of a solution of this substance in which the rayon is immersed.

Unfortunately, delustering processes usually give the viscose rayon a somewhat harsher handle; and to avoid this it is necessary to impregnate the fabric with one or other of the large number of proprietary soluble oils (usually sulfonated vegetable oils) now available. But in many instances excellent results are obtained by using simply an olive-oil emulsion prepared by heating together olive oil and caustic potash, the latter in an amount insufficient to saponify all of the oil.

At the present time there are distinct signs that the public taste is changing, and that dull-luster rayon materials will be displaced by brighter ones—approximately a half-delustered rayon. When this change occurs, it will be possible to make viscose rayon fabrics much more attractice than at present.

Today a wide range of direct dyes is available for dyeing evenly viscose rayons of various qualities, but it is still difficult to secure equal depths of shade on both fibers in a cotton-viscose fabric. Research on the conditions of dyeing necessary to secure equality have had only a limited success, and it appears that the chief assistance must come from the dyestuff manufacturers. It is hoped that in the near future they will discover a range of dyes which color viscose rayon no deeper than cotton. The alternative is for viscose manufacturers to produce a rayon which has somewhat less affinity for direct dyes than the rayon now being produced.

In order to secure fast colors on viscose rayon goods increasing use is being made of Naphthol AS dyes. After dyeing with these products, it is usual in the case of cotton to give the goods a soap boil; this treatment removes loose color and improves the fastness of shade. In the case of viscose rayon, however, high-temperature soaping loosens rather than fastens the dye; and therefore should be avoided, especially with shades obtained with Naphthol AS + Fast Red 3GL base, Naphthol AS.RL + Fast Orange GR base, Naphthol AS.RL + Fast Red RL base, Naphthol AS.LT + Fast Orange TB base, and Naphthol AS + Fast Red B base. With these combinations, soaping should be carried out at a temperature just below 60° C.

Increased Strength

In the opinion of the writer, strength is the most important property of a rayon which demands research. Yet very little progress appears to have been made recently along these lines. Real expansion in the rayon industry will come when this fiber can compete in durability with the older fibers. When viscose, or an other synthetic fiber, can displace cotton and wool on account of its superior strength, the rayon industry will really go ahead. That day no doubt will come; but it is not yet here.

What's Beyond Rayon?

By Winn W. Chase
Assistant Editor
TEXTILE WORLD

These products from—

◆ *Visible advances in the manufacture of synthetic fibers during the last several years have been confined largely to improvements in the appearance and quality of the four well-known types of yarn. Reports now and then of partially perfected commercial developments, some of them radical in nature—and of laboratory experiments ever more fantastic—have had passing attention. But seemingly grotesque as are some of the proposals, nevertheless they are possible of execution. Other developments—scarcely less revolutionary, but more comprehensible perhaps—give promise that the synthetic fibers of the next decade will be as far removed from those we now use, as present-day rayon is from the artificial silk of the pre-war era.*

What then is beyond rayon?

If it were possible actually to see some of the experiments which are now being conducted, we might better answer that question. . . .

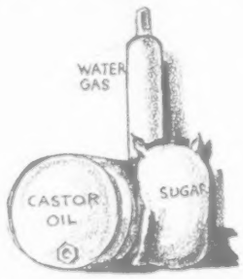
CONSIDER, therefore, that we have been invited to visit the plant of — shall we name it — the Synthefiber Research Syndicate. The director of this imaginary establishment—let us call him Dr. Walters —greets us in his office. He explains that the organization which he heads is endeavoring to find which of these proposed methods of synthetic-fiber manufacture have the greatest potential value.

"Come with me into the semi-works laboratory," continues the doctor, "I shall be glad to show you some of the things we are doing.

"Bamboo, ramie, cornstalks—there are a few of the cellulose-bearing raw materials with which we are experimenting. Sugar cane, bulk-harvested cotton, many others have interesting possibilities. Likewise we are are not neglecting chitin, shark skin, silk waste, and similar nitrogenous compounds, which dissolved in suitable solvents can be spun into fibers closely resembling real silk in appearance and properties. It is but recently that reports were issued citing Von Weiman's progress in the production of a synthetic fiber from fibroin dissolved in sodium iodide, and Rossner's work along the same line using phosphoric acid as a solvent. Three or four years ago, you remember, Dr. Little, as a stunt, made a silk purse from a sow's ear.

"Here are other raw materials which may cause you to smile—a barrel of sugar, a drum of petroleum, one of castor oil, and a cylinder of compressed water gas. Theoretically, it is possible to convert any one of these into synthetic fibers. Actually, it is stated that A. S. Ford has been able to produce from sugar a hard, insoluble, glass-like mass, which in slightly altered form may be suitable for making transparent wrapping materials and textile filaments; one of the larger oil companies is said to have interested itself in the process for bringing petroleum into suitable form for spinning; and P. K. Frolick has conceded the possibility of utilizing for textiles the products of high-pressure hydrogenation of water gas. Only this month Carothers and Hill exhibited synthetic fibers produced from ethylene glycol — a popular antifreeze compound—and a derivative of castor oil.

"For most of our experiments, however, we are using wood pulp and linters as bases. Over there are our spining machines. In one section, you notice, we are forcing colored solutions through the spinerets, thus making subsequent dyeing of the yarn or fabric unnecessary. In the next section we are precipitating viscose in a concentrated acid bath much in the same manner as does Lilienfeld. This enables us to produce a fiber with a tensile strength several times greater than that of normal viscose. There is still a little difficulty in processing this type of rayon, but that will be remedied shortly.



these raw materials

"You all are familiar, no doubt, with the Brandwood process and with Breda rayon. If you will step this way, I can show you a washing, desulfurizing, and bleaching unit somewhat similar to that used in the Brandwood method. The complete treatment, even to dyeing and sizing, is carried out on the spool, without need of winding the yarn into skeins. The Breda process also obviates skein winding, the rayon being desulfurized, bleached, and dried in cake form.

"Here are spinning machines of various types for nitrocellulose, cuprammonium, acetate—you have seen similar equipment before—but in the room we are now entering a number of interesting trials are being conducted. On this machine we are making cellulose-ether rayon. The equipment over to your left is for the production of cellulose formate, cellulose butyrate, cellulose dibenzoate, and other esters not yet available in commercial quantities.

"We are now in the testing laboratory where the various fibers and yarns which we are studying are subjected to rigid examination. And here we are again at the door to my office.

"Which of all our experiments is the most promising? At the moment I cannot give you a direct answer. Many forms of raw cellulose when acted on by calcium thiocyanate or other salts are transformed into colloidal solutions without chemical destruction of the cellulose. Perhaps a synthetic fiber produced in this simple manner, or one of the cellulose ethers, or possibly one of the nitrogenous compounds will be next major development in the synthetic-fiber industry. Ultimately, indeed, we may find it unnecessary to rely on any of the natural cellulosic raw materials, but will be able to build up from single chemicals complex organic compounds suitable for spinning into synthetic yarns. Keep in touch with me, and as progress is made, I shall keep you posted."

Not More Sales But More Profits Is

Rayon Keynote for 1932

A Market Survey

THE last six months have shown what even a temporary price stability can do for the rayon industry. The final quarter of 1930 was very unsatisfactory; price-cutting and all manner of price privileges had created a feeling of uncertainty among consuming markets so profound as to curtail yarn sales. The industry entered 1931 with a surplus variously estimated at 20 to 30 million pounds. It was far from an auspicious start and with industrial prospects so dark generally, it looked like another bad year.

However, rayon manufacturers learned something from 1930, and the new year was destined to redeem itself, at least in part. Early in 1931, new price levels were announced which, with the guarantee that accompanied them, began to win back consumer confidence. The lower prices were unprofitable and they presented an economic problem which has not yet been solved, but the merchandising situation soon cleared.

Sales picked up steadily through the spring months. Production was watched and output remained low enough to allow assimilation of the surplus with the result that early summer found stocks just moderately in excess of demand. The summer season was a happy surprise; demand rose inordinately and the usually quiet months of June, July and August proved among the best months of the year. At moment of writing, it appears likely that 1931 will set a new record for rayon yarn volume.

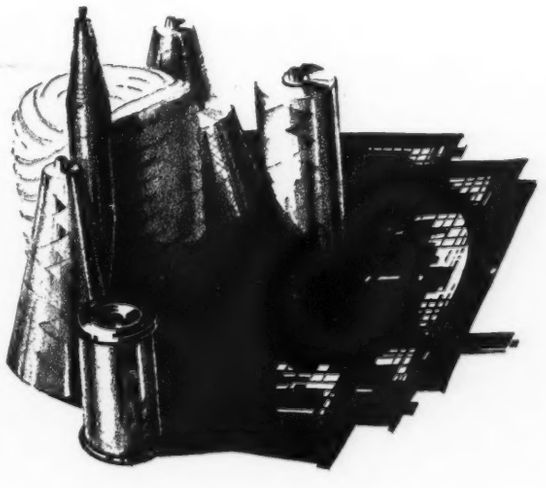
The rush of business also brought some changes in the consuming picture; weavers—usually the secondary outlet for viscose process yarns—rose to first position, and recently have been taking 65% of the output, pushing knitters momentarily at least into second place. Prospects are that demand will remain active for the remainder of the year, with the likelihood of backward deliveries of certain preferred sizes due to limited supplies. As regards 1932 outlook for sales, the industry inclines to be rather too optimistic and curtailment of output in December, provided sales wane, would be advisable. It is doubtful whether 1932 will duplicate the "boom" proportions of this year, though a very healthy demand is indicated; certainly it is unlikely that the high-water mark of this year wil be passed.

No Over-Production of Profits

Rayon is enjoying splendid turnover and is spreading steadily into new markets; but with that said the best is said. There will be no over-production of rayon products this year. Prices are virtually at production cost levels. Economies in overhead are being talked of, and they are vitally necessary if any margin of profit is to be eked out. There is a growing belief among producers that rayon's overhead is unduly high. The recent comment of one executive to the writer that "we must get it out of our head that the rayon industry is a bonanza, and we must close up our leaks by rendering our organizations more economical without impairing efficiency," represents a sentiment shared by numerous companies.

The second half may end somewhat more favorably but at best the December financial reports will bring little cheer. Viewing rayon's immediate future two thoughts are uppermost: the jolly pace of unprofitable selling seems to have sidetracked the merger prospects; however, that issue has been scotched, not killed, and will come up again when the industry fully realizes the present inadequate return on investment. An advance in prices of course suggests itself as a solution but any step of that kind before January is improbable; it may be assumed that continuation of unprofitable selling into 1932 will compel producers to further consider the advisability of an upward revision at that time.

Rayon is enjoying splendid turnover and is spreading steadily into new markets



To sum up, the current year has given a splendid demonstration of rayon's growing importance and popularity. While all other divisions of textiles moved precariously through the depression months, synthetic yarns went over the top. Any substantial increase in rayon sales next year even if that did develop would not help the situation particularly, however; the keynote of 1932 should be—not more sales, but more profits.

Rayon Consumption and Price

in Relation to the Other Fibers

By Stanley B. Hunt
Economist, Tubize Chatillon Corp.

◆ *In this article, the writer discusses the price-consumption relationship of rayon with cotton, wool, and silk, giving particular attention to the element of substitution. The growth of rayon consumption since the war has been rapid and sometimes inexplainable, particularly as regards the question "Is the rayon market a new one or is it a substitutive one; and if it is a new market, is it competitive?" The discussion in this article is divided into two parts: the long-term point of view, covering the years 1920 to 1931; and the short-term point of view, with particular reference to the year beginning July, 1930 and ending June, 1931.*

THE two accompanying charts have been drawn to show the relationship between consumption and price for wool, cotton, silk, and rayon during the last 10 years. Complete figures for 1931 have been calculated and are shown by dotted lines on the charts. The calculated trend line for each of these series is as follows:

	Average Annual Rate of Change	
	Consumption	*Price*
Wool	— 3.0%	— 5.4%
Cotton	+ 2.4	— 6.5
Silk	+ 8.0	— 8.1
Rayon	+24.2	—11.8

These data and charts, considered together, are a striking illustration of consumptive substitution, apparently based on price. For whereas the trend of the total poundage consumption of the four fibers as a whole has increased at a rate of about 3% per annum for this period, the individual fibers have shown decidedly different trends in that time. And while the average prices of all the fibers have declined, due principally to the general downward trend of all prices since the war, the individual fibers have shown varying declining price trends during the period. The fact that rayon is a relatively new product in the textile field need not vitiate the above comparison from the standpoint of substitution.

Specifically, the exhibits show that the more the price of a given fiber is reduced, the larger will be its consumption, all in relation to the other fibers, of course. This means that by certain price relationships, the consumption of one fiber may be increased at the expense of another or other fibers; it does *not* mean that lower general textile prices in themselves will stimulate a demand for more textiles.

Stated another way, the trend of the total consumption of textiles as a whole increases at a slow, normal rate each year, with little reference to price; but the consumption of a given fiber may change either more or less rapidly than this normal increase depending on whether or not its price trend is below or above that of the other textile fibers taken collectively.

Future of These Curves

Granting that substitution on a price basis will always be present, which fibers can best "afford" to lower their production costs (and their sales costs) more than the

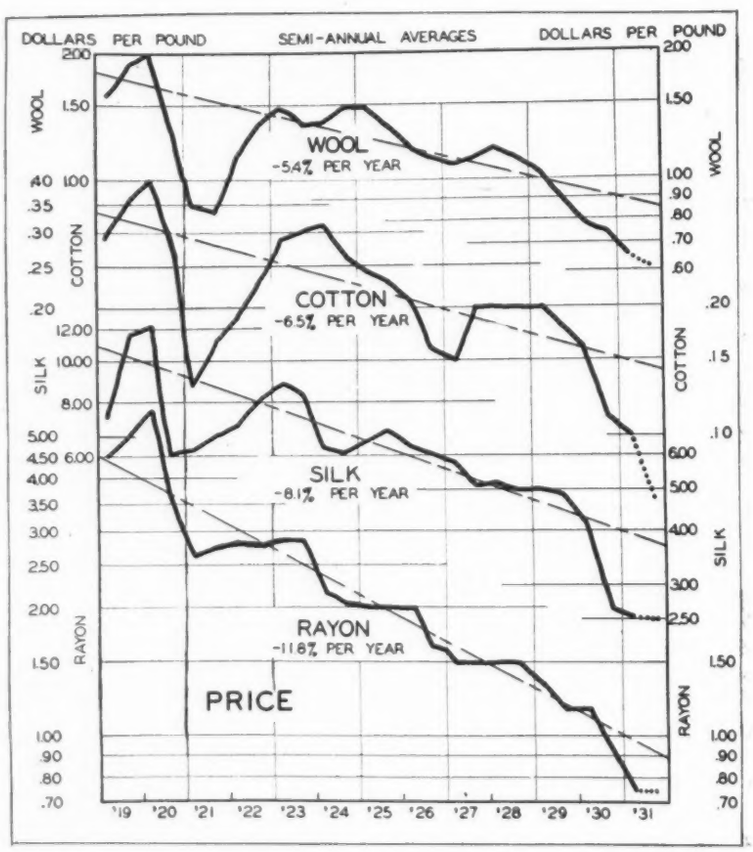


Chart shows price trends of four major fibers during the 13-year period, 1919 to 1931. Dotted lines represent estimates for concluding part of the current year. The solid lines show specific fluctuations for the 13-year period and the broken lines indicate average degree of change.

average so as to substitute for the other fibers in the future? While the final results here largely depends on the ingenuity of the agricultural and industrial chemist and engineer, the writer hazards the guess that the same trends which have been in evidence for the last 10 years will continue for another decade.

He understands that wool prices are below the cost of production for most producers and that little reduction in wool growing costs is expected; cotton can be raised very cheaply, but only on intensively-cultivated, favorably-located, fertile soil; sericulture costs, and particularly silk reeling costs, will probably be substantially reduced in the next 10 years so that many producers who now operate at a loss will be able to sell their product at a profit even at prices such as those currently prevailing; and the possibilities of the chemical laboratory are too well known to suppose anything except that the cost of rayon will be reduced. It is anticipated then that rayon will lead the other textiles in rate of consumption growth in the next 10 years, followed in order by silk, cotton, and wool.

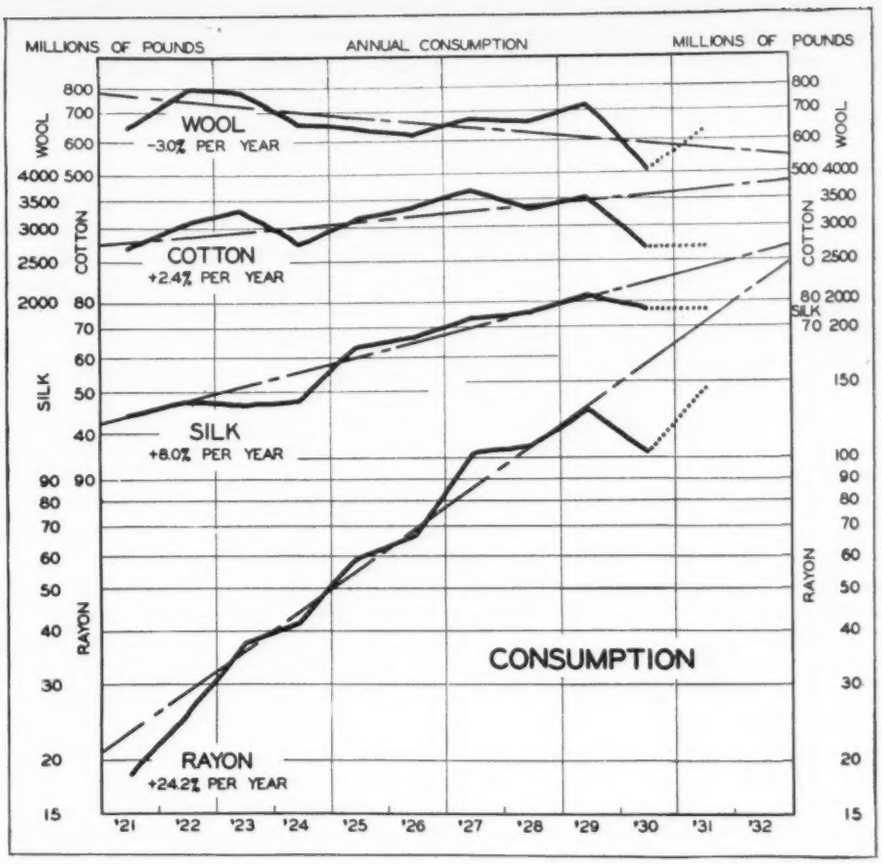


Chart shows relative consumption figures and trends of four major fibers in the decade, 1921 to 1930. Solid line traces movement of volume and dotted line represents estimates for periods for which figures are not yet available.

Textile fiber producers, and the rayon producers in particular, are constantly trying to find the optimum price for their product—that price at which the greatest number of goods are sold at the greatest net profit to the producer. Under a given set of conditions, if the producer makes too many goods there is oversupply and his net return declines because the increase in quantity is not enough to off-set the decline in unit price; if he makes too few goods, there is undersupply and his net return falls because there are too few units to be sold even at a high unit price. Therefore he constantly tries to make the right number of goods for his market so that the optimum price will prevail.

It is apparent that the rayon producer should better be able to obtain this optimum price than all the other textile producers, whose supply is governed to a large extent by factors outside their control. By the same token, the rayon producer should be able better to control the degree of substitution which takes place, either favorably or adversely, as between rayon and any of the other fibers.

Limitations of Substitution

What are the limitations of the inter-substitution of textile fibers? The writer believes they are relatively few. It is true that men's suits made of rayon and ladies' slips made of wool are rarities in this day and age; but both of these goods could be made. The real limitations then are such items as style, climate, inertia (ineffectual style), quality, living conditions (heated buildings and a tendency to wear fewer and lighter-weight clothes), and price. Of all these items, it is believed that the most important in the long run is price.

Just as cotton was substituted for linen on a price basis, so has rayon supplanted a good deal of silk and cotton in the underwear field; rayon has entered the hosiery business supplanting some silk directly, but being used more as a cotton substitute by those persons who, because of their economic position, wish to buy hosiery in the price range between cotton and silk. Rayon has developed few new fields of its own; but, such as they are, these new fields are, and undoubtedly will be, both competitive and substitutive. Dull-luster rayon yarn was introduced not only as a substitute for the bright-luster yarn, but also as a complementary yarn, thus enlarging the field of application for rayon.

Because of its appearance and price, then, rayon has tapped a large and fertile consumer buying field and has made a place for itself in the textile picture. There is every reason to believe that this process will continue.

Fiber Price Determinants

Lastly in this picture of long-term prices, the main determinants of individual fiber prices should be considered. Without going into the reasons thereof in this article, it is believed that cotton prices from year to year are determined mainly by supply, wool prices are fixed principally by demand, silk prices result from a curious mixture of supply and demand with emphasis on the latter, while rayon prices are determined mainly by the prices of the other fibers. And in the case of rayon, the price set has tended to be a substitutive price, a price which tends to be lower than that of the other fibers. Supply is not, and should not be, a serious factor in the rayon price situation.

The same general principles of substitution which

obtain in the long term also hold true in the short term. However, there are additional factors of interest in the near term picture, and especially in times of business depression, some of which are of more temporary importance than the long term determinants of substitution.

First among these to be mentioned would be the influence of the speculative markets on cotton and silk particularly. In cotton, even more than in silk, the action of the security exchanges during the last year has seemed to be of more importance than any other single factor. The story is told that every time U. S. Steel common dropped one point, a certain group of speculators sold 20,000 bales of cotton short of the market. In any case, the close correspondence between cotton prices and security market prices is too well known to require any demonstration.

The prices of wool and rayon, as well as silk, during the last year have necessarily followed the lead of cotton from the viewpoint of substitution if for no other reason.

The recent decline of cotton prices to the 7c. level was predicated on the first Government crop report, of course, and had no relationship to the level of prices in the security market at all. This drop in prices is a striking illustration of the previously mentioned point that cotton prices depend mainly on supply.

The influence of the general commodity price level is of especially strong import in time of business depression. Cotton, wool and silk, as raw materials, have felt this external downward pressure on prices and rayon has followed their lead out of necessity.

Concerted Movement of Fiber Prices

This concerted movement of textile prices is especially pronounced in such times as the last 18 months. In time of business depression, there is evidently a more than usually vigorous attempt to keep the fiber prices in a real, competitive (non-substitutive) position. This fact leads to the conclusion that, barring temporary out-of-line price positions of individual fibers, the forecaster of textile prices must be either a bear on *all* textile prices or else he must be a bull on *all* of these prices at a given time. It would appear that the person who simultaneously makes a six-months' forecast of higher prices for one or more textile fibers and lower prices for the remaining textile fibers, in such a time as the present, is simply at loggerheads with himself. The realization of such a situation would be contrary to factual experience.

Finally, it might be asked, "Why was there a real spurt in general textile activity beginning about last November and continuing through July of this year, while general business activity had only an abortive spring rise?" One answer is that textiles, in the main, are consumers' necessary goods and are not industrial goods like steel, coal, etc.; their consumption is less susceptible to adverse business conditions therefore.

Another reason is the very definite existence of a two-year cycle in textile productive activity. It is quite certain either that the textile industry overproduces and underproduces its market in alternate years or that the consuming public does the most of its buying in alternate years. At least, the year 1931 was indicated as the year for high, cyclical textile activity and so far into this year, history has repeated itself.

As to the actual consumption of the fibers during the last year, wool consumption has increased this year to date due principally to the replacement of men's suits at attractive prices and the general popularity of woolen fabrics for the spring and fall seasons.

Cotton consumption has increased due to the same replacement demand at reasonable prices. It should be noted, however, that cotton consumption has not increased relatively as much as some of the other fiber consumptions have, due principally to the fact that cotton has more industrial goods made from it than do the other fibers. The slowness of industrial activity this spring has been noted previously.

Silk and rayon consumption during the last year must be considered together, for here is the greatest example of the price-substitution theory in a time of business depression. From the low point of silk consumption in June, 1930, to the high point at the end of 1930, the rayon price situation was fraught with uncertainty; silk was substituted for rayon to a large degree as evidenced by their consumption curves. In January of this year, the rayon price situation was clarified and guaranteed. From that time on, rayon consumption increased to record-breaking levels while silk consumption has continued to decline to date. It would seem that no clearer case of substitution on a price basis could be shown.

Conclusion

Substitution is demonstrated to be a very real factor among the textile fibers. Substitution is based on price principally, as evidenced either from the long-term or the short-term point of view. Rayon has created some new fields, but they are competitive, substitutive fields. Because of the possibilities of production-control and cost-control in the rayon industry, the artificial fiber will apparently make further new inroads on the natural fibers. This being true, the consumption and price trends of textile fibers in the last ten years are expected to continue through the next decade.

Rayon Price Changes Should Be Postponed, Says Brunet

"THE general outlook covering the rayon industry for the immediate future is quite satisfactory," states R. S. Brunet, president, Woonsocket Rayon Co. "In many types of yarn there is a shortage and immediate delivery cannot be made from warehouses. Undoubtedly the stocks on hand in warehouses have been reduced to a point which can be considered normal, or slightly subnormal, and we are of the opinion that this has been brought about by the fact that the producers are giving the users a 90-day price guarantee. In our opinion it would be a grave mistake to change the present rayon situation by any revision of price schedules. The rayon converters would undoubtedly like to go through one year without any revamping of their own price schedules, even though their consumption is protected on the 90-day schedule formerly mentioned.

"While it is true that the producers themselves are not making any real money under the existing price situation, it is equally true that the consumers for the most part are regaining their confidence in the manufacturers, and nothing whatever should be done to destroy this growth at this time. Undoubtedly the price of rayon will have to be revised upward some time in the future, but it seems that in spite of any talk as to strengthening of prices, this matter should be postponed until the world situation is improved and the spirit of confidence restored to all lines of industry."

Increased Use of Staple Fiber *Brings New Problems to the Dyer and Finisher*

By Ray Cottrell

STAPLE fiber is finding ever-increasing application in the textile industry, and the processing of fabrics, composed wholly or in part of this material, has added to the problems of the dyer and finisher. Among the popular fabrics containing staple fiber are suitings, dress goods, shirtings, lingerie, underwear, lace, pyjama cloths, hosiery, plushes, velvets, carpets, automobile upholstery, and artificial furs. In addition, staple-fiber yarns are knitted into sweaters, jackets, and various articles for sportswear, and are woven into fabrics for wall panels, blankets, turkish towels, and damasks. Certain satin fabrics contain fine mercerized cotton warps with a 100% staple-fiber filling. Even satin-backed crepes have been manufactured successfully. Some of these materials may subsequently be printed or embossed, yielding results which would not discredit natural silk. Fabrics manufactured from staple fiber can be washed and ironed as easily and often as those containing the continuous filament, but like the latter they should never be mangled.

Properties of Staple Fiber

Among the many peculiar properties of staple-fiber yarns is one which occasions certain objectionable features during wet processing; namely, its tendency to swell abnormally when wet. Staple fiber increases about 50% in diameter on becoming wet, in comparison with about 33% and 10% for viscose and acetate continuous filaments respectively. Consequently, in the initial wet processing of staple-fiber fabrics great care must be exercised to allow this excessive swelling to take place thoroughly and uniformly.

This is particularly the case with dress goods and shirtings having two-ply yarns both in the warp and filling. These fabrics, being of fairly close construction, have but little room for the individual threads to assume their maximum diameter, and in consequence there is a distinct tendency to form creases, which, if not removed before dyeing, will render the finished fabric unsalable. These creases may be avoided by wetting out the goods slowly and uniformly much after the manner of treating all-rayon crepes.

If one will but bear in mind this predisposition of fabrics containing an appreciable proportion of staple fiber to crease, and will take the necessary precautions, the source of the majority of process troubles will be eliminated. Materials, such as illustrated in Fig. 1, and which are required either in a shirting or silk finish, must be singed. However, the short staple fibers are more inflammable than cotton fibers, and the material must be kept in the open width by plaiting down in trucks. It is frequently an advantage to pad the goods through a dilute solution (3 to 4%) of caustic soda and allow to lie plaited down in the open width for about ¾ hr. All but the heaviest fabrics may then be transferred to the reel to be scoured and dyed.

With those fabrics which must be maintained at open width, smooth-running jigs should be used. In addition, all rollers should be parallel, as otherwise the slightest application of the braking mechanism may result in tearing of the warp. Furthermore, any undue tension exerted by the rollers will prevent the material from assuming its maximum shrinkage, an essential feature in the finishing of staple-fiber fabrics.

When scouring this type of material in the reel, it is recommended to run cold for a few minutes in the open width before putting in the rope form. This precaution will enable the fabric to shrink and will further assist the uniform swelling of the staple fiber with a corresponding decrease in the tendency to form creases.

Thorough Scouring Needed

Considerable amounts of straight mineral oil have been and still are used in the preparation of staple-fiber yarns, consequently the scouring liquor should contain an efficient solvent, preferably in the emulsified form. Scouring should be commenced at about 110° F., taking about 1 hr. to raise to 180° F., the latter temperature being maintained for a further ½ hr. A 50-gal. bath should contain 5 lb. white soap (63% fatty acid), 1 lb. soda ash,

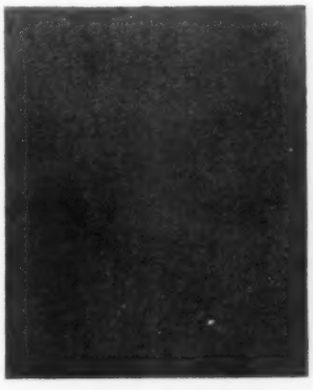


Fig. 1. Silk finish on fabric composed of 60/2 staple-fiber yarn

Fig. 2. Wool finish on fabric of same construction as that illustrated in Fig. 1

and 2 lb. emulsified solvent (50% pure solvent). After scouring and rinsing, the goods may be dyed in the same machine, or they may be dried and pad dyed.

Some unexpected results have been obtained, however, when padding certain shades on dress goods containing two-ply 100% staple fiber in both warp and filling. Certain colors of the type of Chlorantine Green BL and Pontamine F. Blue 4GL gave very dull shades when dyed directly on the padder and subsequently dried on the 90-ft. tenter. Addition of even excessive amounts of wetting-out agents such as Nekal BX, failed to remedy the trouble. Fortunately this defect was finally overcome by transferring the padded material, without drying, to a jig and giving two or more ends in water at 140° F.

Similar precautions had to be observed when dyeing naphthol reds on this material. The regular practice of padding and coupling on the jig gave streaky results, with the color all on the surface of the fabric. Nekal BX and other wetting-out agents in the padding bath failed to cure the trouble. Again the problem was solved by padding and transferring to the jig. The goods were given two ends in water at 140° F., and the "prepare" developed without drying.

After dyeing and rinsing, the material should be extracted at open width over the suction or vacuum extractor and dried on a 90-ft. tenter, being passed through the quetch containing a small amount of softener. It was found that dyeing was facilitated by the presence of ½% of white soap in the dyebath.

Silky Finish

In order to obtain a silky finish on dress goods, such as the sample illustrated in Fig. 1,. the fabric after dyeing but without rinsing, is run for 15 min. in a solution containing 0.25% of formic acid. The material is then extracted and dried on the tenter, allowing about 5% filling shrinkage. After drying and conditioning, the goods should be finished on a silk calender and then, if necessary, on a breaker.

For a shirting finish, the same goods, after extraction, are passed through a solution containing 5 lb. of locust-bean gum, 2½ lb. of double-sulfonated castor oil, and 1 lb. of olive-oil soap in 50 gal. of water. This solution may be applied in the quetch at the entering end of the tenter. The goods are dried, allowing about 3% filling shrinkage, calendered. and given a final run over a 30-ft. tenter with steam.

For a muslin (wool) finish the fabric is singed on the right side, scoured, and dyed as described above. After rinsing, it is extracted and dried on a 90-ft. tenter at about 120 to 140° F. It is essential to allow about 5% filling shrinkage for this finish, which gives the fabric a full handle and fulled appearance. The handle may be further improved by passing the goods through the quetch containing 2 lb. of double-sulfonated castor oil and 2 lb. of olive-oil soap in 50 gal. of water. After drying on a 90-ft. tenter and conditioning, the goods are napped lightly on the back. They are then passed through a silk calender to increase the luster on the face, and are given a final steaming on the short tenter.

Another popular finish on this same cloth is illustrated in Fig. 2. Finished in this manner, the fabric is used for underwear, as it possesses a full, warm handle reminiscent of suede, and is quite hard-wearing, and also of a pleasing subdued luster. This fabric which, in the gray, is identical with that in Fig. 1, is singed as before on both sides, padded in caustic soda solution of 4° Tw., and scoured in soap and soda ash of double the strength of that mentioned previously. This treatment, which resembles fulling in its effects, is prolonged for 2 hr. at 190 to 200° F., and results in a warp shrinkage of about 20%. The material is dyed and dried as before, using a small amount of softener in the quetch. After the lightest of nips through the calender, the fabric is finished on a 30-ft. tenter, using steam.

Finishing Dress Goods

Other 100% staple-fiber dress-goods materials are illustrated in Figs. 3 and 4. The fabric in Fig. 3, containing 60/2 staple-fiber yarn both warp and filling, has been plate singed, padded in caustic soda solution, scoured and peroxide bleached in the reel. It was then vacuum extracted, dried on a 90-ft. tenter (using a softener), calendered, and passed over the breaker. Fig. 4 represents a similar finish on printed material.

In Fig. 5 is illustrated a shirting finish on a poplin consisting of 60/2 staple-fiber warp and a 100-denier

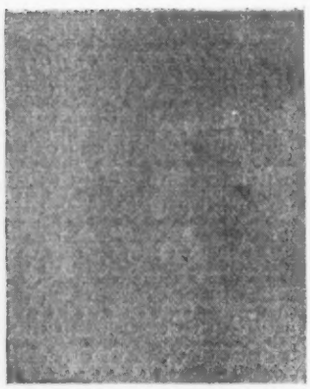


Fig. 3. Dress-goods fabric —60/2 staple fiber in warp and filling

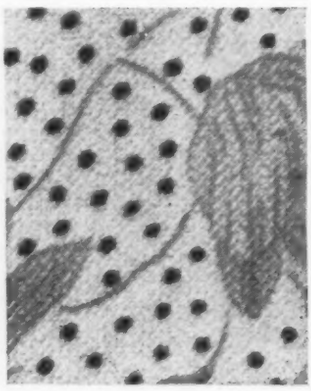


Fig. 4. Printed dress-goods fabric—20/1 staple fiber in warp and filling

Fig. 5. Poplin—warp, 60/2 staple fiber; filling 100-denier continuous filament viscose

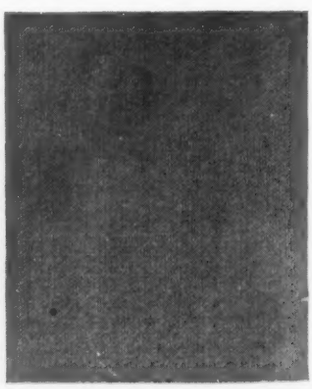


Fig. 6. Shantung crepe—warp, 150-denier continuous filament viscose; filling 60/2 staple fiber

continuous-filament rayon filling. This fabric was plate singed, scoured, dyed on the reel, and finished as described above for shirtings.

A Shantung-crepe dress-goods material composed of 150-denier continuous-filament rayon warp and 60/2 staple-fiber filling is illustrated in Fig. 6. This material was singed both back and face, scoured, bleached with chemic, and dyed on the reel. It was then vacuum extracted and dried on a 90-ft. tenter using a small amount of a double-sulfonated castor oil in the quetch, calendered, and steamed on a 30-ft. tenter.

Pile Fabrics

Pile fabrics—of which the principal items are plushes, velvets, and certain novelty cloths—require somewhat more care in finishing than do those previously illustrated. More or less common faults to be avoided in the wet processing of staple-fiber pile fabrics are loss of luster, distortion of the pile, and cracks or permanent breaks in the pile.

According to the weight of fabric to be processed, the goods are scoured in the open width or in the rope form, the lighter constructions being handled by the latter method. The heavier constructions, which are liable to contract wavy selvages and creases, are handled in the open width.. The methods employed vary to some extent with each type and weight. Certain heavy plushes and velvets may, for instance, be brushed two or three times in one process, while lighter fabrics may be brushed only once. Again, heavy fabrics may require two or more passes over the vacuum extractor, while the lighter velvets require only one run.

In general the procedure is as follows: After the initial cutting and examination, pile fabrics are brushed and sheared, while the higher grade-materials are frequently singed at this stage. Then follows a preliminary clearing or scouring of the fabric, which contains considerable amounts of stiffening agents, etc., the method of procedure depending on the nature of these substances. This operation is carried out in the open width, preferably on a smooth- and true-running jig, particular care being exercised to avoid any residual stickiness in the pile.

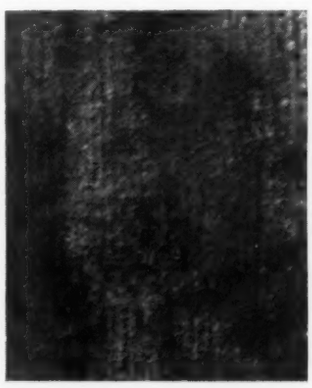


Fig. 7. Velour with 20/2 staple-fiber pile

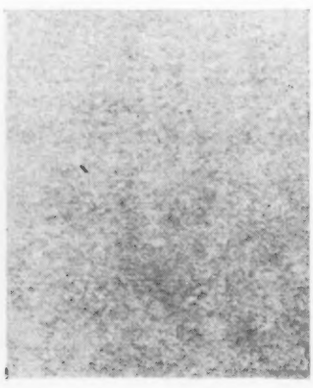


Fig. 8. Blanket fabric with cotton warp and 10/2 staple-fiber filling

After vacuum extracting, the fabric, with the pile on the outside, is dried over drying cylinders. The next operation, that of dressing or brushing, practically determines the success or failure in the raising of a first-class pile. The brushes, in working crosswise to the pile, produce a soft, free, continuous, and lofty pile.

The goods are now singed (thereby rendering the pile smooth and even) and then are sorted into batches suitable for colors or black, according to the quality of the pile. The scorched ends of the staple fiber require scouring and bleaching, especially for light and bright shades. A preliminary mild alkaline treatment followed by a peroxide bleach is generally considered to give the loftiest pile and best luster.

Here again the necessity of maintaining the pile fabric free from all stickiness at this stage cannot be over-emphasized, and it is practically essential to use softened water for scouring and dyeing. As an additional safeguard, especially if the water is not of zero hardness, it is recommended to use solvents which also have the property of dispersing lime soaps. Among such solvents are pine oil, tetralin, hexalin, etc., the first-mentioned being available in the soluble form when compounded with potassium abietate or oleate. A typical scouring liquor for staple-fiber plush consists of 2% of soluble pine oil and ¾% of soda ash. Scouring is conducted for 1 hr. at 160° F., after which the goods are thoroughly rinsed and dyed in the same machine.

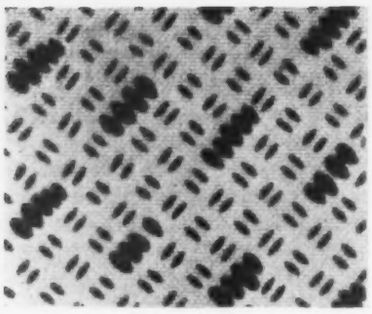
Matching Staple Fiber and Cotton

Staple fiber has a considerably greater affinity than cotton for direct colors, and though the cotton is not visible except from the back, manufacturers seem to insist on a good match between the two fibers. For this reason, dyeing should be commenced at about 120° F., and the bath maintained at that temperature for about 15 min. This will cause the color to go on the cotton, and by slowly raising the temperature to 180° F. the staple fiber may be covered. Glauber salt may be added at this stage if required.

The following dyestuffs are among those recommended as yielding solid shades on staple-fiber pile fabrics with a cotton back: Pontamine Fast Yellow 4GL (C.I.—), Pontamine Yellow CH (C.I. 365), Direct Fast Yellow NN (C.I. 814), Erie Fast Orange GG (C.I. 621), Chlorantine Fast Brown 3GL (C.I.—), Benzo Chrome Brown R (C.I. 597), Pontamine Fast Pink BL (C.I. 353), Solantine Red 8 BL (C.I. 278), Pontamine Scarlet 4BS (C.I. 326), Niagara Blue RW (C.I. 512), Chlorazol Fast Helio BK (C.I. 319), Chlorantine Green BL (C.I.—), and Pontamine Fast Black FF (C.I. 539).

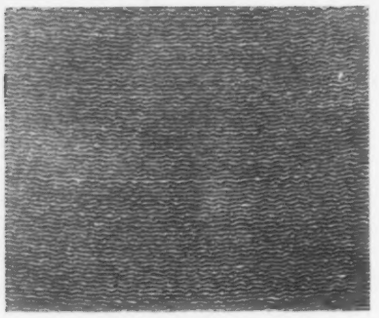
After dyeing, the fabric is rinsed thoroughly and passed over a vacuum extractor at open width, the number of runs depending on the nature of the pile and the weight of the goods. The goods are then dried on a frame at 140° F., and to avoid creasing at the lap edges, are batched on rolls. They are then brushed to open and straighten the pile and to bring the short fibers to the surface.

Subsequently the goods receive a thorough steaming and brushing, the former operation softening the pile and rendering it lofty so that the brushes can accomplish their work of removing the residual short fibers. This operation is repeated until the required softness is obtained. In order to remove the mass of short tenacious fibers which now collect on the surface of the pile, the fabric finally is sheared to produce a clean and uniformly surfaced pile. Typical examples of pile fabrics finished in this manner are shown in Figs. 7 and 8.



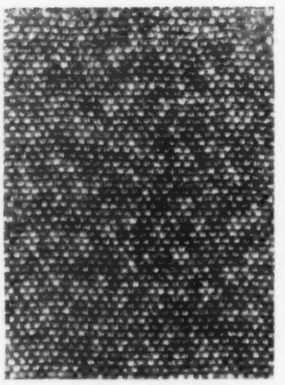
1. Spun Rayon

Set 43 in. in reed.
Warp, 60/2 spun rayon.
100 sley, or 50/2/1 reed.
4-shaft harness weave.
Filling, 30/3, spun rayon.
42 picks in loom.
Finished width, 39 in.
Plain dye or printed.



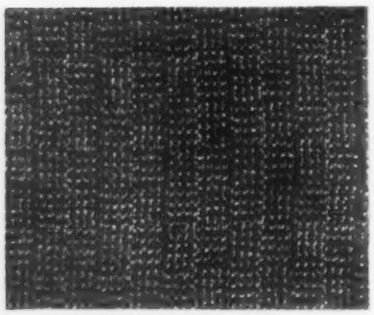
4. Spun and Filament Rayon

Set 45 in. in reed.
Warp 100/40-den. rayon, 1st quality.
126 sley or 42/3/1 reed.
6-shaft harness, plain weave.
Filling, 30/2 spun-rayon crepe, 2 R. and 2 L.
36 picks in loom.
Finished width, 39 in.
Plain dye.



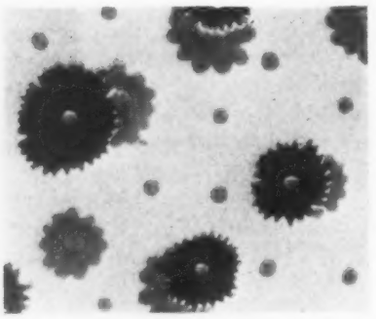
3. Spun Rayon and Acetate

Set 43 in. in reed.
Warp, 100-den. acetate yarn.
240 sley or 48/5/1 reed.
6-shaft harness of 4-shaft ground and 2-shaft binder.
Filling, 32/2 spun rayon, hard twist, 35 turns one way only.
48 picks in loom.
Finished width, 39 in.
Plain dye or surface print.



2. Spun Rayon

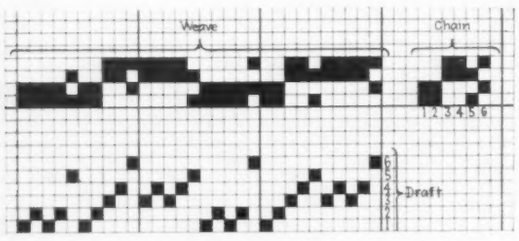
Set 43 in. in reed.
Warp, 60/2 spun-rayon crepe, right twist only, and 60/1 spun rayon with 100-den. acetate yarn, twist on twist, left way only.
80 sley or 40/2/1 reed, 4-shaft-harness weave.
Basket weave.
Filling, same as in warp.
64 picks in loom
Warp-End Layout, One Repeat.
4 ends of 60/2 spun-rayon crepe.
2 ends of 60/1 and 100-den. acetate twist.
2 ends of 60/2 spun-rayon crepe.
2 ends of 60/1 and 100 den. acetate twist.
2 ends of 60/2 spun-rayon crepe.
2 ends of 60/1 and 100-den. acetate twist.
2 ends of 60/2 spun-rayon crepe.
4 ends of 60/1 and 100-den. acetate twist.
2 ends of 60/1 spun-rayon crepe.
2 ends of 60/1 and 100-den. acetate twist.
2 ends of 60/2 spun-rayon crepe.
2 ends of 60/1 and 100-den. acetate twist.
2 ends of 60/2 spun-rayon crepe.
2 ends of 60/1 and 100-den. acetate twist.
Pick Layout, One Repeat.
4 picks of 60/2 spun-rayon crepe.
2 picks of 60/1 and 100-den. acetate twist.
2 picks of 60/2 spun-rayon crepe.
2 picks of 60/1 and 100-den. acetate twist.
2 picks of 60/2 spun-rayon crepe.
2 picks of 60/1 and 100 den. acetate twist.
2 picks of 60/2 spun-rayon crepe.
4 picks of 60/1 and 100-den. acetate twist
2 picks of 60/2 spun-rayon crepe.
2 picks of 60/1 and 100-den. acetate twist.
2 picks of 60/2 spun-rayon crepe.
2 picks of 60/1 and 100-den. acetate twist.
2 picks of 60/2 spun-rayon crepe.
2 picks of 60/1 and 100-den. acetate twist.



5. All-Rayon Flat Crepe

Set 43 in. in reed.
Warp, 100/40-den. dull-luster rayon.
120 sley or 40/3/1 reed.
Filling, 100/40-den. rayon crepe, 50/55 turns, 2 R. and 2 L.
72 picks in loom.
Plain weave, 6-shaft harness.

Research Aids



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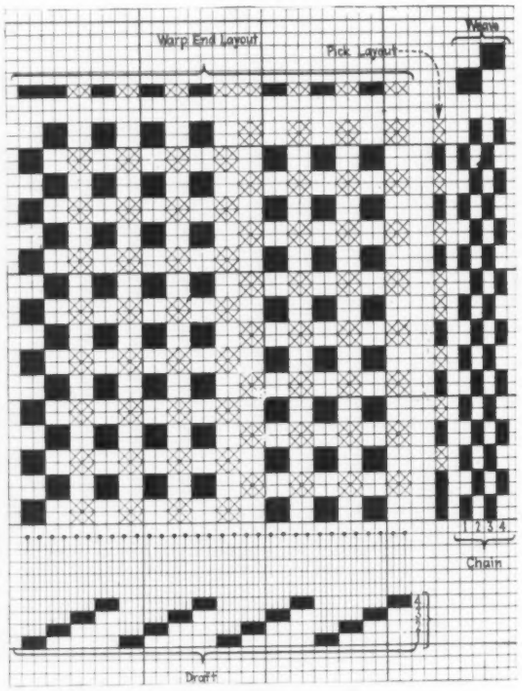

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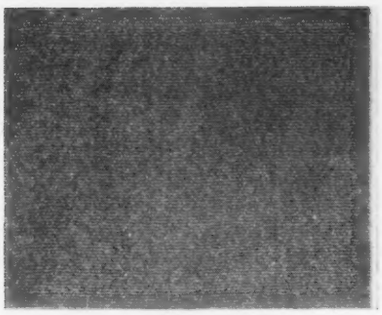
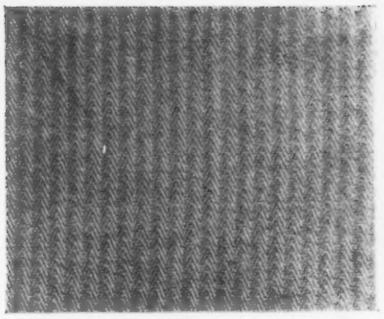


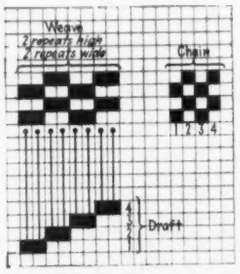
6. All-Rayon Canton-Crepe Type

Set 44 in. in reed.
Warp, 100-40-den. dull-luster rayon.
100 sley or 50/2/1 reed.
Filling 150/40-den. rayon crepe, 45/50 turns,
2 R. and 2 L.
52 picks in loom.
Plain weave, 4 shaft harness.

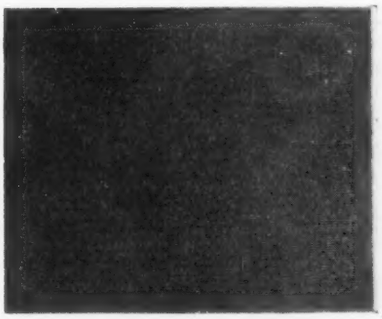


8. Rayon and Tussah—Women's Suiting

Set 43 in. in reed.
Warp, 100/40-den. dull-luster rayon.
116 sley or 58/2/1 reed.
Filling, 2/22 spun tussah.
58 picks in loom.
Weave, 2/1 twill and reverse, herringbone.

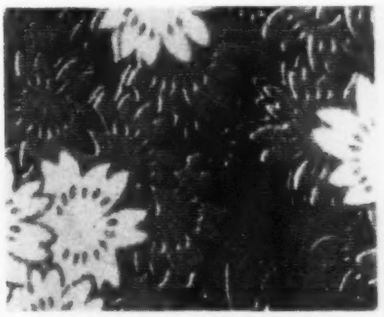


Design and drafts for sample No. 1



7. Fine All-Rayon Faille

Set 43 in. in reed.
Warp, 75/30-den. dull-luster rayon.
150 sley or 50/3/1 reed.
Filling, 100/40-den. rayon crepe, 50/55 turns,
2 R and 2 L.
64 picks in loom.
Plain weave, 6-shaft harness.



Dress, Gro-de-Londre

Set, 43 in. in reed.
Warp, 100/40-den. bright-luster rayon
120 sley or 40/3/1 reed.
Filling, 24/1 cotton crepe, 2 R. and 2 L.
48 picks in loom.
Plain weave, 6-shaft harness.
Lift 4 and drop 2.

Development of

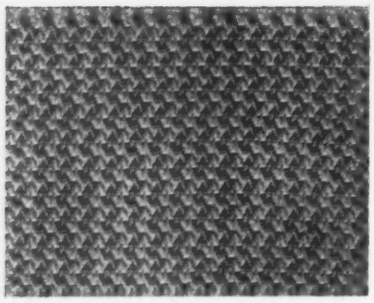
All-Rayon and Mixture Fabrics

By Carl C. Mattmann, Jr.

Fabric Technician, New York

WE KNOW that absolute perfection in merchandise is hardly obtainable, but certainly a larger amount of research on the part of the mills would help greatly in correcting many defects occurring daily. Studying and recording for future reference the behavior of different synthetic yarns in the various processes, for example, would solve many problems, avoid many pitfalls, and otherwise facilitate the development of satisfactory fabrics. An efficiently organized department for studying and testing fabrics, having the sincere and earnest support of the mill creating it, is becoming more and more necessary as an aid to meeting the rapidly growing demands for new fabrics—novelties particularly. This is especially the case with spun rayon—the latest addition to textile yarns.

Therefore, not only the large manufacturers, but also the smaller ones, should set aside in their own plants the necessary looms for experimental purposes, the actual number of such looms depending on the size of the plant. For a mill of 1,000 looms or more, ten should suffice for this work. In smaller plants about one per cent of the machinery should be thus used. The mills

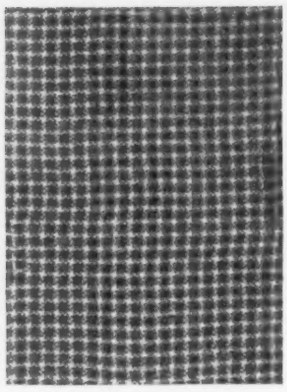


11. Women's Suiting

Set 44 in. in reed.

Warp, end and end of { 100/26-den. dull-luster acetate. 100/40-den. dull-luster rayon.

192 sley or 48/4/1 reed.
Filling, 2/50s worsted, hard twist, one way only.
56 picks in loom.
Weave as sketch, 13-harness straight draw.



10. Checked Rayon and Acetate Georgette

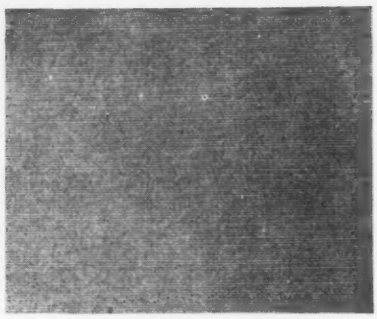
Set 47 in. in reed.

Warp layout { 4 ends of 100/40-den. rayon crepe, 2 R. and 2 L. / 2 ends of 100/26-den. acetate, 5 turns. } 1 repeat

56 sley or 56/1/1 reed.

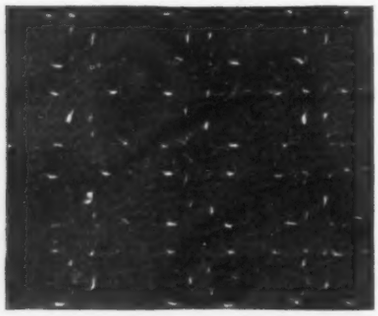
Filling layout { 4 picks of 100/40-den. rayon crepe, 2 R. and 2 L. / 2 picks of 100/26-den. acetate, 5 turns. } 1 repeat

72 picks in loom.
Plain weave, 2-beam job.



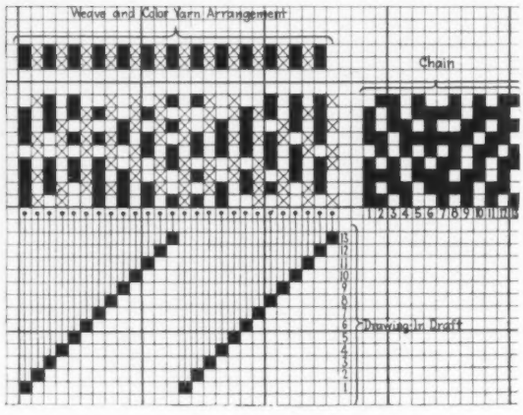
12. Corset Fabric, Batiste

Set 37 in. in reed.
Warp, 15/40-den. bright-luster rayon.
144 sley or 48/3/1 reed.
Filling, 60/2 combed peeler cotton.
72 picks in loom.

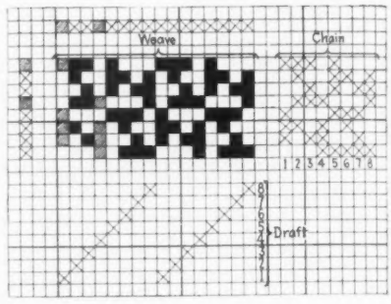


13. Flecked Woolen—Fall Coating

16½-oz. cloth.
Set 68 in. in reed, to finish 56 in.
Warp, 1¾-run woolen yarn, 8 turns per in., and a 1¾-run wool yarn with a twist on twist of 2 ends of 300-den. rayon yarn.
20 reed used, 20 ends per in.
Filling, 1¾-run wool yarn, 6 turns per in., and a 1¾-run wool yarn with a twist on twist of 2 ends of 300-den. rayon yarn.
16 picks in loom.



Design and drafts for sample No. 11



Design and drafts for sample No. 13

would then be in a better position to develop new and superior fabrics, including new weave combinations, and to experiment with the use of new synthetic yarns, both alone and in conjunction with yarns of the older fibers —such as cotton, wool, and silk. These experimental looms and other pieces of equipment should be kept at all times in first-class condition. All new attachments and improvements having possibilities of improving the merchandise should be tried out on them.

There are certain precautions which all mills should observe in the routine handling of synthetic yarns in the regular manufacturing processes. The condition of all yarns should be determined. Care should be exercised in removing them from the case. Winding machines should be in good condition, with correct and true-running swifts and firm spindle shafts. Bobbins or spools should not be worn. They should be compact, but not rock-hard; no others should be employed. Looms must be in good condition and not run at too great a speed. Cut harnesses and reeds must be avoided.

The fabrics illustrated herewith, accompanied by their constructions, all have merit and are typical of the results of careful study and experiment. They should earn a deserved popularity and increased demand.

Ryan Sees Assurance of Continued Increase in Rayon Use

THE past six months have been a revelation to the manufacturers of rayon in respect to the tonnage of yarn that may be consumed, in the opinion of Leon H. Ryan, general manager, Delaware Rayon Co.

"Stable prices and increased quality have induced a greater number of textile manufacturers to adopt rayon than ever before," states Mr. Ryan. "The styles and cloth that this increasing circle of manufacturers are distributing are meeting with favor because of price and quality and it seems that there is a definite assurance of a continued increase in tonnage for the rayon industry over the future.

"There is indeed the opportunity of every rayon manufacturer to feel optimistic."

Between Stretch and Expense in Rayon Humidification

By Edwin D. Fowle
Associate Editor, TEXTILE WORLD

KNOWING full well the injurious effect of water on the strength of rayon, early users of our newest fiber approached with considerable caution the idea of humidifying rooms in which it was to be handled. Certain experienced cotton men particularly were so awake to the difficulties involved that they segregated from the main body of their weaving machinery all those looms which were to handle rayon, and shut off the humidifiers in the isolated sections—all without first experimenting to see just how well-founded their theories were. Others approached the problem with more boldness than wisdom and found that at the relative humidities which they had been using on other fibers they were stretching their rayon beyond its elastic limit.

Experience eventually made it evident that too little moisture permits the fibers to become brittle, relatively stiff, and not sufficiently resistant to friction. It allows them to carry considerable static electricity, which renders the yarn fluffy and unmanageable. Too much moisture, it was found, reduces not only the strength of the fiber, but also its elasticity, with the result that an objectionable elongation occurs when the yarn is placed under tension. The speed of operation was found to be restricted by either excessive or insufficient moisture.

Unfortunately the point at which all technical objections to both low and high humidities are most satisfactorily balanced comes at an inconveniently low point on the scale. In order that this level might be held throughout the year, either objectionable heating or dehumidification by costly refrigerating equipment would be necessary. Consequently a compromise between stretch and expense is required.

The practical humidity for most processes, when no other fiber than rayon is involved, is about 50%. This percentage is to be recommended for all-rayon winding, warping, and weaving. In knitting, however, where pliability is of especial importance and moisture is of advantage as a lubricant for the fiber, a relative humidity of from 60 to 65% is more desirable. Acetate yarns are less affected by moisture than are others composed of synthetic fiber, and therefore there are fewer restrictions on the amount of humidity to which they may be subjected.

The most practical temperature is of course around 80° F., as comparatively little difficulty is found in maintaining that figure throughout the year and it is not an uncomfortable temperature in which to work. Sometimes as high as 95° is employed in order that a low relative humidity may be obtained without dehumidification, but the benefit is largely lost in the decreased efficiency of the help due to the uncomfortable working conditions and in the likelihood that the rayon will be stained by perspiring hands. The latter objection is mainly important in the preparation of yarns which are to be sold, and as a result a few mills producing such yarns have found it worth while to adopt dehumidification for warping and winding.

When rayon is employed in conjunction with other fibers, as is frequently the case in weaving particularly, we cannot base our decision entirely on what is best for the rayon, as the other fibers must be considered. Hence it is necessary to reach a compromise between that percentage which is most desirable for one yarn and that which is best for the other. Naturally the decision rests very much on the proportion of each. It also depends upon the specific character of the yarn and upon the nature of the weaving.

Common relative humidities for the weaving of all-cotton fabrics range from 65 to 85%, and much higher figures are by no means unknown. Except at the low end of this range, the moisture content resulting is too much for the elasticity of the rayon. Generally speaking, about 60% is the safest and most satisfactory compromise; although, if the tension on the yarn is moderate, a humidity of 70% is possible. The problem is simpler in the weaving of woolens and worsteds, because such fabrics, when composed entirely of wool, are best woven at relative humidities of from 50 to 60%. With silk the problem is not difficult, as moderate humidities of from 50 to 70% are ordinarily maintained.

No doubt the best way to find the ideal relative humidity is to begin at a low point—say, 50%—and increase the amount gradually, perhaps 1% each day, noting the effect on the rayon. When unsatisfactory results begin to be observed, the adjustment can be returned to the last satisfactory point and that adopted as permanent.

Equal in importance to the selection of a suitable humidity is the maintenance of uniformity. Even if the percentage chosen is not absolutely the best, it is more desirable to hold it at the point selected than to let it continually fluctuate. Variations result in irregular tension, which causes considerable trouble in the operation of all processes and unevenness in the woven or knitted fabric. In these days of accurate automatic control there is no excuse for unstable atmospheric conditions.

Experienced Views on Rayon Twisting, Winding, and Warping

By Stewart H. Gilston

◆ *Although there have been no outstanding developments in rayon twisting, winding, and warping during the last year, many minor changes have been made with a view to improving quality, speeding up production, and lowering costs. In the accompanying article the author points out where these improvements have been made and what he believes have been the benefits derived from them. Practical suggestions which may be applied to twisting, winding, and warping and which are herewith explained should be of value to rayon men.*

THE past year has experienced no radical changes in the machinery and equipment of the rayon throwster, but has been rather a year given to refinements and the adaptation of equipment to the throwster's particular needs.

It has been found in some cases that reverting to earlier methods was necessary to maintain quality previously secured. Quill winding from skeins, which works out well on some deniers, has been found to produce seconds in the weave room, due to shiners, broken filaments, etc.; and, as a higher spindle speed can be maintained when running from spools than from skeins, the cost of spool and quill winding can be kept at, or very near, the cost of the single-process winding.

The demand for delivery of the finer deniers on cones has caused many throwsters to change their cone-winding spindles from the sharper, tapered spindles to those accommodating cones of the bull-dog type. As there is less difference in diameter between the two ends of the bull-dog cone, there is less variation in speed with which the yarn is taken up as the traverse moves from the nose to the base of the cone, which effects less variation of tension. Thus a spindle speed of 1,000 r.p.m. may be maintained on finer deniers with less danger of strained yarn, broken filaments, and bad cones caused by yarn slipping on the sharp taper. By eliminating these troubles, the waste percentages are dropped.

The lengthening of the skeins by the rayon manufacturers has lowered winding costs, as an operator can handle more spindles; but these skeins, as reeled by some manufacturers, have been difficult to wind after dyeing, causing some throwsters to buy long skeins for filling bleached orders and the shorter, old-type skeins for dyeing. Metal spools, commonly used for shipping rayon, caused waste, since the yarn often ran into the space between the metal head and the paper barrel. This caused about six or eight layers of yarn to be left on the spool when run off. Running five or six turns against each head when starting prevents the yarn from running under the head when it is dropped into the traverse.

The trend on twisters of the upstroke type is to double decks, which have long been available, thus saving floor space. Wider gages are also finding favor. Gear changing has been simplified so that the use of a chart is unnecessary for most twists.

Soaking and Extracting Eliminated

In preparing rayon for winding, soaking and extracting are being forgotten in favor of easier, cleaner, and quicker methods—the quickest being the spray-pump method of spreading out a number of bundles on a metal-covered table and using a measure to govern the percentage of oil applied. Another method is that of soaking heavy brown paper in oil and placing it in the bottom of the case, then placing a layer of skeins on the paper, then another oil-soaked paper, a layer of skeins, etc. This method is slower, as the case must stand over night so that the oil will be absorbed.

The best method found by the writer is as follows: The case is opened, the bundles are placed upright in the case, and the end of each is opened, exposing the end of the skein. From a measure, cut from a can so that it holds half of the amount of oil desired, the oil is poured into each bundle. After standing about two hours, the bundles are turned over, the ends opened and oiled with the same amount used on the opposite ends, and the bundles are allowed to stand two hours more. The oil

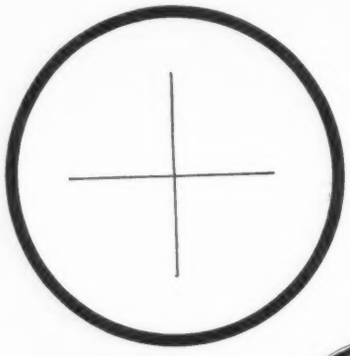


Fig. 1. Simple tension device to fit over bobbin

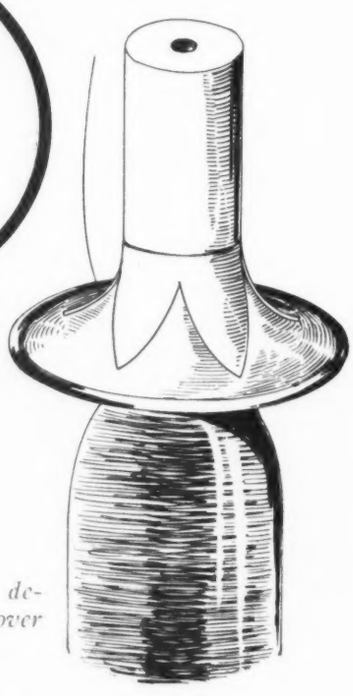
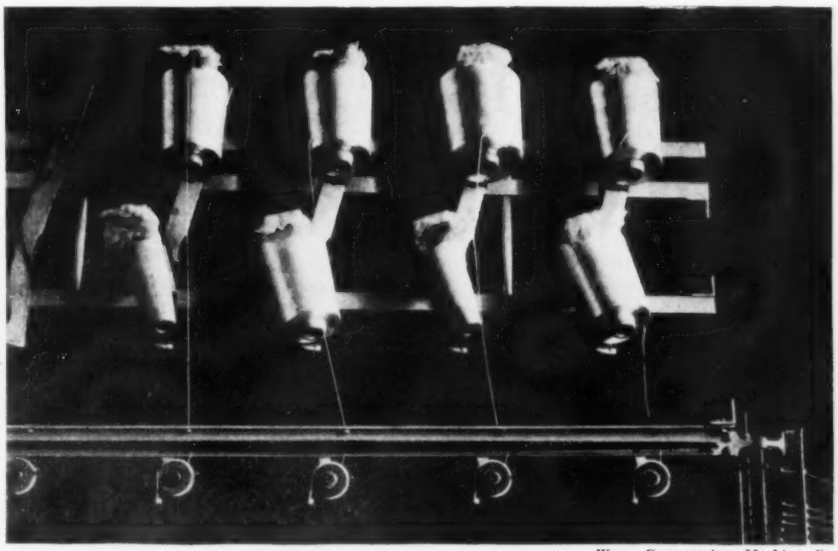


Fig. 2. Tension device in position over filling bobbin

soaks in as evenly by this method as by any other, and the labor involved is far less—so much so that the saving more than pays for the amount of oil absorbed by the paper.

Last year many warping mills were replaced by high-speed magazine-creel cotton-type warpers; and the running of 150 denier at the speed of 150 to 175 yd. per min. was a great step ahead. The writer has at the present time a warper of this type running a small number of ends at the rate of 325 yd. per min. on 150-denier viscose-type yarn from jumbo and bull-dog type cones, averaging eight stops per 14,000-yd. beam, and has run 100-denier acetate yarn at the same speed. The use of high-selvage preventers of patented design greatly aids in keeping the selvage straight. Good cones are essential in running at this speed.

The use of a stop motion in the warper creel in place of the loom-type drop-wire stop motion arrests the warper in most cases before the broken ends runs onto the beam. This is particularly advantageous when leases are put into the beam. Many warpers of rayon have tried leasing beams to aid in slashing; but if an end breaks down between leases with the loom-type stop motion, the end runs in and the beam makes two or three revolutions before the end is pieced up, resulting in that end being several yards shorter than the others. When the lease comes up, the shorter ends have to be pieced out.



Warp Compressing Machine Co.

Use of stop motion in warper creel facilitates leasing beams to aid in slashing

It has been found good practice to warp rayon voiles on the cotton system; and, as slashing is unnecessary, the writer has found the following procedure to work out well for preparing a 2,800-end, 38-in. spread, on a 42-in. beam for weaving, the yarn being 75-denier, 28-turn voile twist.

The up-spinner is particularly suitable for twisting this yarn, as it is capable of high spindle speed, gives even twist, and twists the yarn onto spools ready for a spool creel without further winding; but as no up-spinners were at hand, 240-spindle wet-twist ring twisters had to be used. The top rolls were covered with flannel and calfskin, porcelain eyes substituted for brass thread guides, and warp bobbins used to lessen the strain due to the variation in the diameter of the package. Although these bobbins contained less yarn than that held by filling bobbins, the quality desired warranted their use.

On the $1\frac{3}{4}$ by $\frac{3}{8}$-in. ring, Nos. 22-24 steel travelers were used and run at a speed of 8,000 r.p.m. Travelers were changed every four weeks, which was about two-thirds of their running life—this to insure against soft travelers being cut. Pure sperm oil was used on the rings; for, although its cost was high, there were less oil spots on the yarn and the rings blackened less quickly.

Straight filling wind produced less waste than either warp or combination wind. No knots were tied by the twister tender; and when an end broke down, a new bobbin was put on. This avoided dirty knots showing in the warp of the cloth.

Conditioning in a steamer such as is used for cotton yarns puts the yarn in shape for spooling. Mere exposure of the yarn to hot moisture is sufficient to set the twist; and often, when the steamer was not available, the water in the trough used to wash ring rails in the twisting room was brought to a boil, the steam turned off, and the rayon voile yarn piled on top of the trough on pin boards and covered with paper. After standing thus about one hour, the twist was set perfectly. Although this was a crude makeshift, it shows that a wet, hot vapor rather than hot, dry steam caused by high pressure, sets the twist.

Winding Problems

Winding of the warp bobbins to spools and filling quills presented difficulties, because, unlike cotton crepes, the rayon would not adhere to the bobbin enough to impart a slight tension to the yarn, causing it to bunch up when run through a tension. A device, easily made, which allows filling wind to be run through a tension, was worked out and gave perfect results. To a ring slightly larger than the diameter of the package, was sewed a piece of flannel (Fig. 1). Two slits were cut into it so that it would slide down on the bobbin barrel of its own weight to a point where the four peaks were about $\frac{1}{4}$ in. below the top of the wind. The yarn was slipped through the cut, the ring dropped on the barrel, Fig. 2, and the yarn run in the usual manner.

Four beams of 700 ends were warped with leases on the top of each beam, the lease comb and flat-tape double lease being used instead of gummed paper to facilitate laying-in warps in the beamer. A V-shaped stand was built to hold the beams so that the ends from the back beams were high enough to clear the beams in front.

As no beaming comb that would give few enough ends per dent when contracted was available, a loom reed with 700 dents in $38\frac{1}{2}$ in. was cut, the rough edges ground down, and a wooden frame which would fit into the beamer clamped to it. The bottom beam was laid-in one to a dent, then the second beam likewise, until the four beams were laid-in, giving 2,800 ends, 4 ends to a dent. Plenty of tension on the warper beams and plenty of paper in the loom beam, with gummed paper in place of a lease on the top of the loom beam, made a warp which wove well.

Care must be taken throughout the processes to insure that every time a knot is tied about a yard is broken off of each end before tying in order that slack twist around the knots may be avoided.

Fig. 1. 150-denier, 38-filament viscose

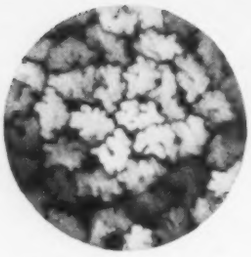


Fig. 2. 150-denier, 24-filament viscose

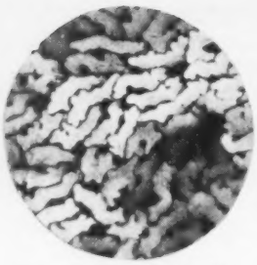


Fig. 3. 150-denier, 30-filament viscose

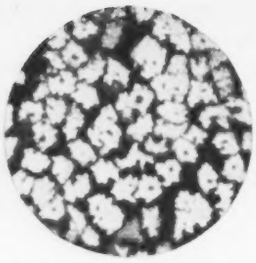


Fig. 4. 100-denier, 40-filament viscose

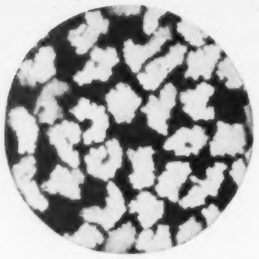


Fig. 5. 300-denier, 62-filament viscose

Ample Room for Standardization in Rayon Field

By W. F. Edwards

Research Director, United States Testing Co., Inc., New York

RAYON yarns have now reached such a state of commercial importance as to warrant a careful consideration of standard definitions, standard specifications and tolerances and standard methods of tests for proving the specifications and tolerances. Committee D-13 of the American Society for Testing Materials has adopted "tentative standards" on all these points. Brief comment on these tentative standards may serve to indicate their relative importance and adequacy.

Committee D-13, after several years' consideration, recently adopted tentative definitions of rayon, rayon yarns, spun rayon, nitro-cellulose rayon, viscose rayon, cuprammonium rayon, and cellulose-acetate rayon. These definitions answer every practical purpose but might reasonably be a subject of academic criticism in some respects. The list might have been made longer to advantage by including such terms as multi-filament rayon yarns, delustered rayon yarns, and others in an attempt to do away with some of the confusion which nowadays is found in the use of these terms.

Committee D-13 adopted, with the definitions, tentative chemical methods for the identification of the four rayons defined, but has appended a note which indicates that the committee is not convinced of the adequacy of the tests in all circumstances.

The writer's observation has convinced him of the adequacy of identification of these four types of rayon by the use of cross-sections and the microscope, it being required of course that the technician be skilled in the technique of making the cross-sections and in the manipulation of the microscope and the lighting used. D-13, a few years ago, published photographs of cross-sections for this purpose; but they are now to some extent obsolete, inasmuch as they are somewhat unsatisfactory in indicating too much definiteness of the cross-sections, which have changed with the variations in the denier size of the filaments in these later years, especially in the case of the viscose-rayon filaments. The following text and photographs of cross-sections of some viscose rayons will indicate very well the variety that is now obtained, and the photographs of cross-sections of the other three types will indicate the characteristics of each.

Figs. 1 and 2 are photomicrographs of cross-sections of filaments of 150-denier viscose of the same manufacture, Fig. 1 representing 38-filament yarn and Fig. 2 only 24-filament. Figs. 3 and 4 are photomicrographs respectively of 150-denier, 30-filament, and 100-denier, 40-filament viscose of another manufacturer. It will be seen that in both cases the finer filament (Figs. 1 and 3) has an elongated cross-section, which is more or less crumpled on itself in the case of the coarser filaments (Figs. 2 and 4). If one were to terminate his investigation with the products of these two manufacturers, he might be inclined to believe that elongated cross-sections were the rule for the finer filaments. A comparison of Figs. 5 and 6, however, representing respectively 300-denier, 62-filament; and 300-denier, 44-filament viscose would throw doubt on this conclusion; but this is an exceptional case and should not be given serious consideration in drawing a general conclusion.

Other cross-sections of viscose filaments made by one manufacturer are shown in Figs. 7, 8, and 9, the filament size of 7 and 8 being the same ($2\frac{1}{2}$-denier), while 9 is coarser (about 3-denier). Figs. 10, 11, and 12 show cross-sections of viscose of yet another manufacturer, of which Figs. 10 and 11 have the same size filament ($2\frac{1}{2}$-denier) and 12 has a coarser filament (about 5-denier). Everything taken into consideration, results in the case of cross-sections of viscose filaments seem to show that at present the finer the filament, say from 3-denier down, the most elongated the cross-section.

Figs. 13 and 14 show cross-sections of two unusual varieties of viscose filaments; the first, hollow-filament viscose, the second artificial horse-hair viscose.

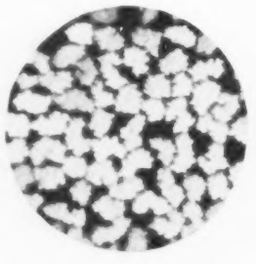


Fig. 9. 170-denier, 60-filament viscose

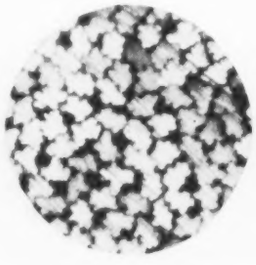


Fig. 10. 100-denier, 40-filament viscose

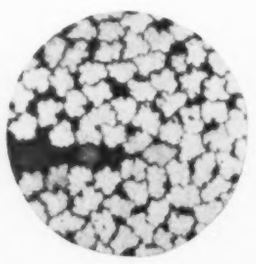


Fig. 11. 150-denier, 60-filament viscose

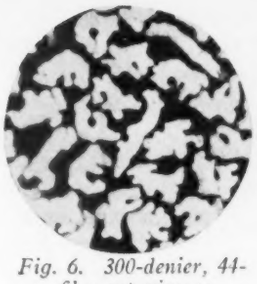


Fig. 6. 300-denier, 44-filament viscose

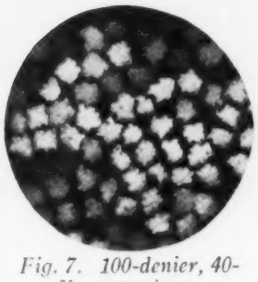


Fig. 7. 100-denier, 40-filament viscose

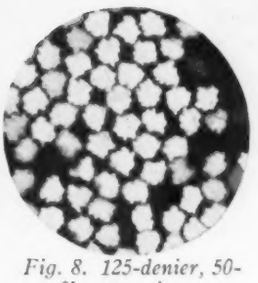


Fig. 8. 125-denier, 50-filament viscose

Characteristic cross-sections respectively of cuprammonium rayon, Chardonnet rayon, and cellulose acetate are shown in Figs. 15, 16, and 17.

It is safe to state that one familiar with the technique of making cross-sections of filaments and the technique of the microscopic examination of such sections will be able to distinguish with a fair degree of safety the four types of rayon from each other; but he will not be able to identify with any useful degree of safety the manufacturer, nor determine the denier size of the filament.

Committee D-13, in giving tolerances for yarn numbers, has left the impression that the count of spun-rayon yarns is stated in deniers. This might be considered as a step toward simplifying yarn numbers. As a matter of fact, the International metric count for all kinds of yarns adopted by the Paris Conference in 1900 is as simple as can be devised and to some extent is in use in Continental Europe. In this country and in England, the English cotton-count system is used for spun silk and spun rayon yarns, except that the plied yarns are numbered as found, instead of on the basis of the single. The single count, however, is used as the basis when plied cotton yarns are being considered. The International metric count, if used by all countries, would simplify the whole matter, but to cause this to be universally accepted as a standard would be as difficult of accomplishment as the introduction of the metric system of weights and measures in all countries.

Tentative test methods for determining yarn size, strength, twist, etc., of rayon yarns, which are practically the same tests as are used generally for other yarns, have been adopted by Committee D-13.

The standardization of first, second, and third qualities of rayon yarns would be of great benefit to the industry. There is now apparently no approach to uniformity in this respect, the number of defects allowed by one manufacturer bearing no relation to those allowed by another. Moreover, there is no uniformity in regard to kinds of defects that are important in establishing grades.

In the case of spun-rayon yarns, standardization of the staple would be of service and would involve a standard method of determining average and extremes.

There are several chemical factors of importance that might be subjected to standardization to advantage; such as acidity, type of oil, sulfur content, immunization, delustering, etc.

The degree and kind of acidity that rayon yarns will endure without harmful disintegration or weakening during aging has not, so far as I am aware, been definitely established. It probably depends to a considerable extent on the nature of the stock and the method of its preparation. Acidity may be buffered to render acid inert; but if the buffering agent is not permanent, acidity may develop during aging. There is at present no standardized test method of determining whether desulfurization is complete.

Immunization is the same as for cotton, and consists essentially of the formation of aryl or aryl-sulfo esters of soda cellulose, which produces a result such that direct dyestuffs are not effective but which renders basic dyestuffs more effective. This may be serviceable in producing thread effects. So far the process has proved too costly for general application, but standardization might bring forth a less costly process.

Delustering of rayon yarns may be accomplished by several methods. One of the oldest methods involves the formation of barium sulfate on the fibers; and one of the newest involves the use of Japan wax and aluminum soap. This treatment is said to be fairly permanent, withstanding as many as ten washings without perceptible loss of the delustering effect. Either of these processes may be worthy of standardization.

I should like to suggest in conclusion that the standardization of rayon yarns will not bring the greatest benefits to the industries using them until more care is given to standardization to some extent of the manufacturing operations which convert the yarns to fabrics.

Fig. 14. Artificial horse-hair viscose

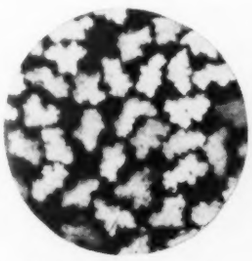


Fig. 12. 150-denier, 32-filament viscose

Fig. 13. Hollow-filament viscose

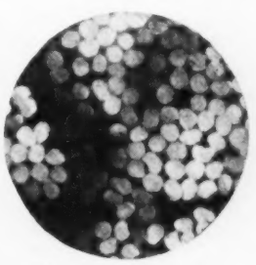


Fig. 15. Cuprammonium rayon

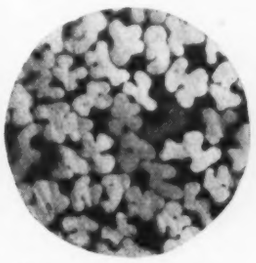


Fig. 16. Chardonnet rayon

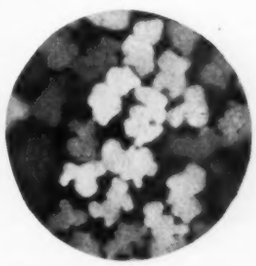


Fig. 17. Cellulose acetate fibers

Fig. 3. Typical rayon figured label

Fig. 4. White cotton warp, orange cotton filling, and rayon figure filling

Rayon Effective in Woven Labels

By Edwin J. Gibbons

PROMINENT among narrow fabrics constructed wholly or in part of rayon are woven labels for marking women's dresses, hats, corsets, and lingerie; men's shirts and cravats; and shoes, scarfs, sweaters, towels, sheets, pillow slips, almost all types and grades of under-clothing, and many other articles. Most of these marking labels are constructed with a cotton ground upon which is imposed a woven name or figure in rayon. The figures depict all sorts of subjects, generally incorporating the trade name or trade mark of the particular concern or product for which the label is made, and often involving a great amount of detail.

Usually but two shuttles are employed in the construction of these labels, one carrying the ground filling and the other carrying the rayon figuring filling. In some labels, however, the number of extra (figuring) shuttles varies from two to four, depending upon the number of different colors required to reproduce the design.

In most cotton-rayon labels the ground is white and the rayon figuring filling is a contrasting color, the object being to render the name or trade mark as conspicuous as possible. In some labels, however, the ground is a pastel shade and the color of the figuring filling harmonizes with the ground. Frequently the pastel shade of the ground is effected by using a white warp and a ground filling of tan, ecru, or orange, the result being, at close range, a mottled effect, but at a short distance resembling a true pastel ground. Occasionally labels are encountered with a solid black ground and a rayon figure filling of a bright hue.

The ground fabric of most cotton-rayon labels is made of fine Egyptian, Pima, or Sakellaridis yarns in counts ranging from 100/2 to 200/2, or the single equivalents; and the texture ranges from 144 to 208 warp ends per inch, and from 92 to 120 picks per inch. Plain weave is invariably employed for the ground texture, as this interlacing produces the firmest fabric.

The size of the rayon figuring filling used in the majority of cotton-rayon labels is 150/1, though occasionally 300/1, 100/1, 75/1, and 45/1 rayons are used. Theoretically, the number of threads of 150/1 rayon that will lie side by side in one inch without crowding and without interlacing is 172, (diameter, .0058 in.); but as the ground texture of the label and the interlacing must both be considered, this figure would naturally be reduced to about one quarter. In closely woven textures, however, such as the ground of labels, the texture often exceeds the theoretical limitations. Then, too, single rayon, because of the very small amount of twist (approximately 2½ turns per inch), is capable of being compressed into a very small space; and for the same reason it may be made to cover adequately, when used as a figure filling, in a texture as low as 92 threads per inch.

The number of threads of 300/1 rayon that will lie side by side in one inch without over-lapping and without interlacing is, theoretically, 122. Obviously, the use of this comparatively large-diameter thread, (.0082 in.) must be confined to correspondingly coarse labels.

Fig. 1. Proper method of stitching down first and last picks

Fig. 2. Improper method of stitching

The best grades of cotton-rayon labels require a figure filling yarn of 100/1 rayon, 75/1 rayon, or 45/1 rayon, and are often constructed with Japan or Tsatlee tram-silk ground filling.

The rayon figure is always shown off to best advantage in designs in which little or no stitching is necessary, because the threads may then reflect back the light at a single angle. In designs in which the floats of the figure would otherwise be exceedingly long, stitching must be resorted to. The stitches, however, should not occur too frequently, either on a particular thread or on adjacent threads. For this reason stitching is often executed in eight-harness or ten-harness satin order.

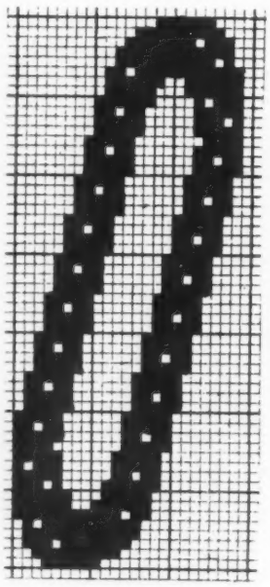


Fig. 5. Method of stitching long floats

In pick-and-pick designs care should be taken as to the manner in which the outer threads of a rayon figure are stitched down. The first pick in a block of figure picks should be stitched by raising a warp end that has been lowered under the preceding ground pick, and the last pick in the figure block should be stitched down by a warp end that will be lowered under the next succeeding ground pick. When so stitched, the tendency is to bind the threads of the block together in a compact figure, as in Fig. 1. Fig. 2 illustrates the wrong method.

A likeness of a cotton-rayon label is shown in Fig. 3, in which very little stitching is necessary excepting in the long bars at the top and bottom of the design. Fig. 4 represents a cotton-rayon label in which the warp is white; and the ground filling, orange. The long figure floats are stitched similar to the design shown in Fig. 5.

Relatively High Price of Rayon Towels Restricts Demands

WHEN rayon terry cloth, including wash cloths, towels, and bath mats, were introduced in the trade, less than two years ago, they sold in fairly large quantities. However, their success at first was due largely to the novel characteristics of the merchandise; and in recent months interest in them has dwindled considerably. At the present time, according to important factors in the towel trade, it is possible for retail stores to offer what appears to be much greater value with respect to size and weight in the all-cotton towel at a lower price. Naturally, with rayon towels priced relatively much higher than all-cotton towels, their sales have been rather slow and confined primarily to gift purchases.

Outstanding in the development of the rayon-pile towel have been the Mooresville (N. C.) Cotton Mills. This company continues to manufacture rayon towels in all the popular sizes, which are piece-dyed in six colors (apricot, pink, blue, gold, lavender, and green), and sold under the "Moor" brand. Cannon Mills have not manufactured rayon towels on a commercial scale and evidently do not consider present prospects.

The construction of the "Moor" rayon towel, made by the single terry weave, is 16s cotton yarn for the filling, 16s cotton yarn for the ground warp, and 150-denier rayon for the top warp. The fabric has 70 ends per inch in the warp and 32 picks per inch in the filling. In handling rayon for terry towels, it was found that most satisfactory results were obtained when the rayon was twisted 10 turns per inch on a regular cotton twister with a front-roll speed of 70 r.p.m. and using a $2\frac{1}{2}$ in. roll.

Comparative Rayon Table

By Edwin J. Gibbons

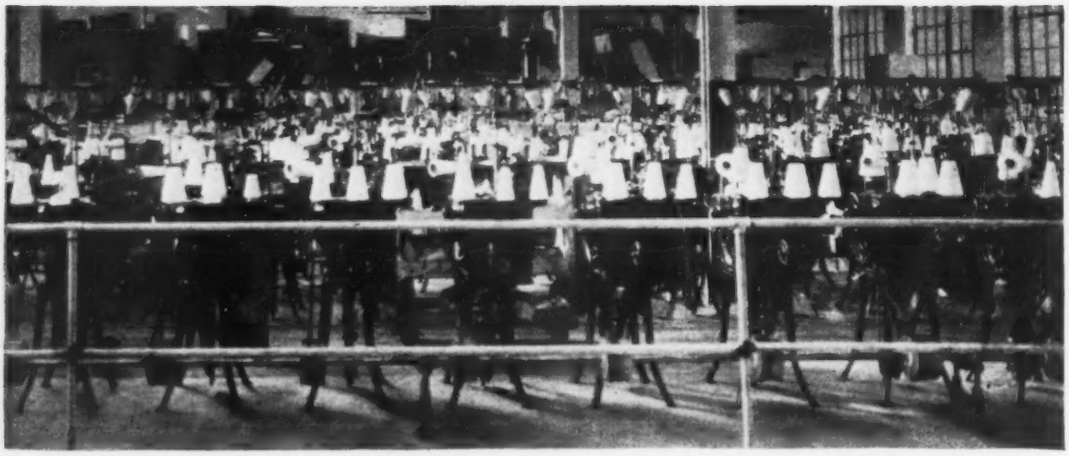
Yarn Number or Size in Deniers	Yards Per Pound	Yards Per Ounce and Tram-Silk Equivalent	Weight in Grains of 120 Yd.	Ends Per Gross (@ 160 Yd.	Threads per Inch (Diam. in Fractional Parts of an Inch)	Diameter Decimally Expressed	Spun Silk and Single Cotton Equivalent	Worsted Equivalent	Linen Equivalent	Meters Per Kilogram
1	4,464,528.00	279,033.00	0.18815	2,790.33	2,112.94	.00047	5,314.91	7,972.37	14,881.76	9,000,000
15	297,635.20	18,602.20	2.8	1,860.22	545.56	.00183	354.33	531.49	992.11	600,000
25	178,581.12	11,161.32	4.7	1,116.13	422.59	.00237	212.60	318.87	595.27	360,000
30	148,817.60	9,301.10	5.6	930.11	385.77	.00260	177.16	265.75	496.06	300,000
35	127,586.51	7,974.16	6.6	797.42	357.19	.00280	151.89	227.83	425.29	257,143
40	111,613.20	6,975.83	7.5	697.58	334.08	.00299	132.87	199.31	372.04	225,000
45	99,211.73	6,200.73	8.5	620.07	314.98	.00317	118.11	177.16	330.71	200,000
55	81,173.24	5,073.33	10.3	507.33	284.91	.00351	96.63	144.95	270.58	163,636
60	74,408.60	4,650.54	11.3	465.05	272.78	.00366	88.58	132.87	248.03	150,000
65	68,685.05	4,292.82	12.2	429.28	262.08	.00381	81.77	122.65	228.96	138,461
75	59,527.04	3,720.44	14.1	372.04	243.98	.00409	70.87	106.30	198.42	120,000
80	55,806.60	3,487.91	15.1	348.79	236.23	.00423	66.44	99.66	186.02	112,500
85	52,523.86	3,282.74	16.0	328.27	229.18	.00436	62.53	93.79	175.08	105,882
90	49,605.87	3,100.37	16.9	310.04	222.82	.00449	59.05	88.58	165.35	100,000
95	46,995.03	2,937.19	17.9	293.72	216.79	.00461	55.95	83.92	156.65	94,737
100	44,645.28	2,790.33	18.8	279.03	211.29	.00473	53.15	79.72	148.82	90,000
110	40,586.62	2,536.66	20.7	253.67	201.46	.00496	48.32	72.48	135.29	81,818
120	37,204.40	2,325.28	22.6	232.53	192.88	.00518	44.29	66.44	124.01	75,000
125	35,716.22	2,232.26	23.5	223.23	188.98	.00529	42.52	63.78	119.05	72,000
130	34,342.52	2,146.41	24.5	214.64	185.32	.00539	40.88	61.33	114.48	69,231
140	31,889.49	1,993.09	26.3	199.31	178.58	.00560	37.96	56.95	106.30	64,286
150	29,763.52	1,860.22	28.2	186.02	172.52	.00579	35.43	53.15	99.21	60,000
160	27,903.30	1,743.96	30.1	174.40	167.04	.00598	33.22	49.83	93.01	56,250
170	26,261.93	1,641.37	32.0	164.14	162.06	.00617	31.26	46.90	87.54	52,941
175	25,511.59	1,594.47	32.9	159.45	159.72	.00625	30.37	45.56	85.04	51,429
180	24,802.93	1,550.18	33.9	155.02	157.49	.00635	29.53	44.29	82.68	50,000
200	22,322.64	1,395.17	37.6	139.52	149.41	.00669	26.57	39.86	74.41	45,000
240	18,602.20	1,162.64	45.2	116.26	136.39	.00733	22.15	33.22	62.01	37,500
250	17,858.11	1,116.13	47.0	111.61	133.63	.00748	21.26	31.89	59.53	36,000
300	14,881.76	930.11	56.4	93.01	121.99	.00820	17.72	26.57	49.61	30,000
360	12,401.47	775.09	67.7	77.51	111.37	.00898	14.76	22.15	41.34	25,000
450	9,921.17	620.07	84.7	62.01	99.61	.01004	11.81	17.72	33.07	20,000
600	7,440.86	465.05	112.9	46.51	86.26	.01160	8.86	13.29	24.80	15,000
900	4,960.59	310.04	169.3	31.00	70.43	.01420	5.91	8.86	16.54	10,000
1200	3,720.44	232.53	225.8	23.25	61.00	.01640	4.43	6.64	12.40	7,500

This table includes all the common sizes of rayon now being manufactured, with the exception of No. 1, which is shown only for comparative purposes.

The figures shown in the column under "Yards per Ounce" are also the equivalents in those silks that are designated in that manner; e.g., 5000/1 Japan Tram (5-thread.), 8000/1 Japan Tram (3-thread), 3000/1 Tsatlee Tram (5-tread), etc., the designations representing the number of yards per ounce in the various sizes after being boiled off.

"Ends per Gross" is a term universally used in the narrow-fabric trade, and signifies the number of threads, each 160 yd. long, that will weigh one pound.

"Threads per Inch" represents the number of threads in the different sizes that will lie side by side in one inch without over-lapping and without interlacing.



There is a trend toward the use of rayon in all parts of the stocking

Improved Rayon

Better Adapted to Circular and Full-Fashioned Hosiery

By William E. Shinn

Professor of Weaving, Designing, and Knitting, Textile Department, Clemson College, S. C.

◆ *In recent years we have learned many important things about winding, storing, and knitting rayon. In the accompanying article Professor Shinn describes some of the methods which experience has taught us to be good practice.* *(All rights reserved by author)*

ACCORDING to a recent report issued by the Tubize Chatillon Corp., 62% of the rayon manufactured in the United States is consumed in knit goods, while hosiery alone accounts for the consumption of 17% of the domestic production of this fiber. It is thus natural that rayon manufacturers and others interested in rayon production and distribution should pay attention to the knitting industry and methods of processing rayon for the production of hosiery and other knit goods.

Synthetic yarns are now being used in all parts of seamless hosiery; and during the past few years they have competed with silk in the full-fashioned field. Improvements in the quality of the yarn, particularly in the fineness of the filaments, which now are equally as fine as the silk filament, has made some of these yarns as soft, supple, and desirable as silk.

The American Bemberg Corp. reports that approximately 35,000 lb. of its multi-filament yarns are being consumed weekly by full-fashioned mills. The bulk of this yarn is 150-denier with five turns of twist per inch. Other deniers being used by the full-fashioned mills are 100 and 120 with from five to fifteen turns per inch. The 150-denier yarn goes into 39-gauge and 42-gauge work, while the 100- and 120-denier yarns with ten to fifteen turns per inch are used on 42- and 45-gauge machines.

All-rayon Hosiery on Increase

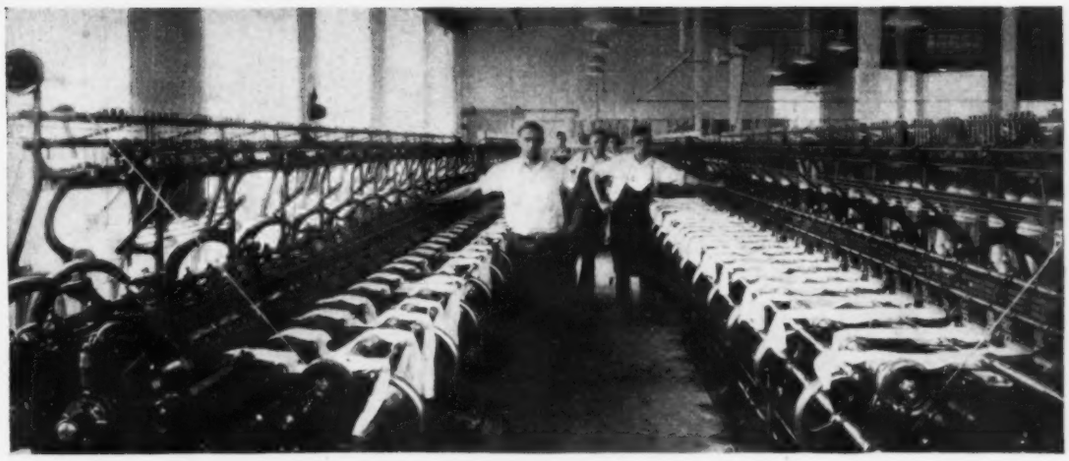
The early types of rayon yarns were not sufficiently durable to warrant their use in all parts of the hosiery. It was thus customary to make the top, heel, toe, and spliced areas of cotton to secure the necessary durability. While cotton and other fibers are still being used in combination with rayon, the tendency is to use rayon in all parts of the stocking. This has been encouraged by improvements in the quality of the yarns, more satisfactory results in dyeing uni-fiber hosiery, and a better-quality product.

According to statistics appearing in the July, 1931, issue of *Textile Organon*, 10.1% of the hosiery manufactured in April, 1930, was of the all-rayon construction, while 14.6% of the production was the figure for the same period in 1931.

Aside from improvements in the quality of the yarn, should be mentioned improvements in the form in which the yarn is being supplied to the knitter. The tendency is to produce larger skeins, which mean a reduction in the number of knots in the final cone or bottle-bobbin package for the knitting machine. Skeins weighing one pound or more are now being produced for commercial use. This preliminary product is then given the required amount of twist and supplied to the knitter without a single knot. Other improvements include a more satisfactory oil-processing by the manufacturer, which makes it unnecessary, in the majority of cases, for the knitter to apply additional oil. At least one company offers its product to the trade in cellophane wrappers. These are beneficial in preserving the moisture, which is an important factor in knitting.

Further improvements which are likely to take place in the processing of yarns for the knitter include refinements in spinning and twisting machinery to permit the production of 2-lb. packages, and other improvements for processing yarns in package form.

In winding rayon, especially the multi-filament types, great care should be taken to prevent damage to the



Rayon is competing with silk in full-fashioned nosiery

filaments. The two most common faults in winding are lack of uniform tension and damage through abrasion. In winding from skein to bottle bobbin, some mills omit rewinding in order to reduce labor costs; but in many cases this is false economy, as more firsts are made from yarn which has been rewound, due to the improved uniformity in tension. The bottle-bobbin winders for rayon are usually equipped with porcelain guides and cleaning blades to arrest knots. The guides should permit free movement of the thread over the blades so the latter will not have grooves cut in them. The blades should be adjusted closely, but not close enough to pinch the thread.

To secure uniform tension, all spindles and bobbins must revolve absolutely true. Any difference in tension is likely to show up in the finished goods. The rayon winder should be designed so the yarn will follow as direct a source as possible. All sharp turns are likely to be a cause of irregular tension. It is not advisable to wind a very hard package. All bottle-bobbin and cone packages should yield to pressure of the fingers. The bobbins should not be over 8½ in. high. A greater amount of yarn may be placed on a taller package, but additional drag is put on the yarn when the bobbin becomes nearly empty.

Storage of Yarn

All synthetic yarns are more or less sensitive to moisture, and lack of uniform distribution of moisture is often the cause of defective goods. It may truthfully be said that all such yarns are stronger in the dry state, yet the presence of moisture aids materially their processing into fabric. For this reason, the proper storage of yarn is important. Direct sunlight, steam pipes, and radiators should be avoided in storing. A thoroughly inclosed storage room, preferably a cellar, is best for rayon.

The atmosphere in the storage room and winding room should have a uniform humidity of 60 to 70%. A rayon thread, on absorbing moisture, increases considerably in length. On drying out the thread contracts. Variations in moisture content in package yarns is thus likely to lead to unsatisfactory results.

The use of a humidor is recommended for preventing evaporation of moisture from package yarns on the machine. These consist of a transparent celluloid cylinder supported by a water-containing base and covered by a cap. This equipment also enables the machines to be operated near open windows without danger of breezes disturbing the yarn.

In knitting rayon, it is essential that the yarn be fed under uniform tension. To secure this, it is necessary that the correct type of tension device be applied to the machine. A metal-disk tension is to be preferred, as it delivers the yarn smoothly without jerking. Porcelain disks are not so satisfactory, since porcelain is a non-conductor. Any static charges which may develop from friction with the yarn are not conducted away and make the yarn difficult to manipulate on the changes, resulting in cutouts and an increased number of seconds. Rayon should not be passed around a metal cylinder tension. This device is too rigid and is likely to break the filaments through excessive friction.

As a rule, tension devices should be located as near to the needles as is practical. Cones should be placed on felt pads which close all space below the base of the cones and prevent coils catching under the package.

Too much tension of the knitting machine should be avoided. Excessive tension not only strains the yarn, but causes sinkers, needles, and thread guides to wear more rapidly and results in chafing of the yarn. These parts should be inspected carefully at regular intervals for grooves and rough places. A magnifying glass will be found useful in locating small nicks which are not visible to the unaided eye.

The size of the knot is an important factor in knitting. The weaver's knot has been found very satisfactory and should be used exclusively. Cylinder walls and needle slots should be uniform and smooth. Anything which causes the needles to slide less freely will result in the formation of longer loops and irregular fabric. The same is true of sinkers.

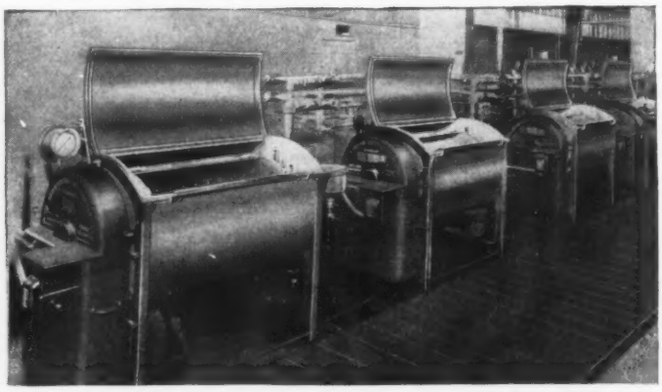
Avoid Mixing Lots of Yarn

It is important that each shipment be processed separately. There are several methods of preventing different lots being mixed. One method is to mark each package with the lot number. Small lots of older yarn should never be used for the footing process, although it has been found practical to use such material in the tops of all-rayon full-fashioned hosiery. They may also be disposed of satisfactorily as splicing yarns.

The storage of unfinished hosiery is an important item in successful production. Slatted bins which permit the circulation of air are satisfactory, provided they are kept free of rats and other vermin. Goods should not be stored for any length of time in oil. The oil oxidizes and may become a cause of uneven results in finishing. The removal of oil in a hot soap bath is recommended before storage. To prevent irregular formation of the mesh, it is recommended also that the goods be drawn on forms and dried slowly at a low temperature. The goods may then be stored without danger of either chemical or physical damage until they are ready to be dyed.

Constant Vigilance Is Necessary in Dyeing Rayon Hosiery

By W. H. Hand



Modern equipment facilitates the successful dyeing of hosiery

DYEING of rayon hosiery to secure best results and to keep the number of re-dyes at the minimum requires constant vigilance on the part of the dyer. Level, bright shades and a soft feel are demanded. Even with the improvements which have been made in rayon and the large range of dyes available, there are many adverse conditions with which the dyer has to contend. But if the dyer will take the necessary precautions, he will be able to turn out satisfactory work.

Requisite to Even Dyeing

A requisite to even dyeing is thorough removal of the oil from the hosiery; and here is the dyer's first problem. Rayon of one type and purchased from one manufacturer may contain an entirely different amount of oil from rayon of another type or obtained from another manufacturer. Again, some oils are easier to remove than others; and one rayon manufacturer may use a mineral oil; another, a vegetable oil; and a third, an animal or a blended oil. If the dyer does not remove all of the oil, he may be troubled with large oil spots on the hosiery; or perhaps after the finished stockings have stood for a few days, the rider tickets will become saturated with oil.

Hard water, or water containing iron may prove disastrous. The dyer must make certain that he has pure, soft water, which is uniform in quality from day to day. Fluctuations in steam pressure cause more trouble than is usually supposed; and this condition should be avoided. Boil-off agents of an unsuitable nature must be shunned. Careful selection of dyestuffs should not be neglected. These are a few of the many items which the dyer must watch.

The writer has found that it is possible to overcome these difficulties and to reduce the total amount of re-dyes (including those caused by the boarders) to about $\frac{2}{10}$ of 1%. The hosiery he is now dyeing is women's circular-knit hosiery, full rayon, with 60/2 mercerized heel and toe, and double sole. Both rotary or paddle machines have proved satisfactory, but the following description of the procedure employed refers particularly to the former type.

Method Employed

The goods are first placed in dye nets or laundry bags and then loaded into the machine. Usually 4 to 5 doz. of stockings can be put in a bag, but crowding must be avoided. Overloading of the machine also must be guarded against. Water is now run in, steam turned on, and the temperature brought to 100° F.

At this time 2% of tri-sodium phosphate and 2½% of pine-oil scour are added, the bath is brought to about 4 in. from the top of the machine, the temperature is raised to the boil (or just below), and the machine run for 25 min. The machine is stopped, and water is run in and allowed to overflow in order to carry off the scum and prevent it from settling on the hosiery.

Next the boil-off liquor is run out, and the machine again filled to 5 or 6 in. from top with warm water. The temperature is raised to 100° F.; 1½% of tri-sodium phosphate, ½% of pine oil scour, and 1% of a good penetrating oil are added; and the machine is run for 5 min.

The dyestuff, previously dissolved and strained, is now entered into this same bath. Steam is turned on, and the dyebath brought to a boil in 20 min. Dyeing is continued for 45 min. at the boil, and a sample taken for matching to shade. Any additions of dyestuffs necessary are made at this time. When the lot has been brought to shade, the dye liquor is run out, the valve closed, and the machine again filled with warm water. The machine is started, 2% of a good oil softener added, and rinsing is continued for 5 min. The hosiery is now ready to be removed from the machine and extracted.

At times the writer has used 5% of soap and 1½% of soda ash for boiling out. As a rule, this combination gives good results; but due to uncertain water conditions which could not be avoided, the pine-oil scour was substituted. Considerable difficulty may arise from the use of unsuitable softening oils. Therefore it is advisable to find a softener which works well under local conditions, and then stick to it. Great care, it was said, is necessary in the selection of even-dyeing colors. Likewise the volume of the dyebath must be correct. If the liquor is too high at the start, the condensation of steam will cause the bath to overflow before the lot is dyed; if the liquor is too low, poor circulation and unsatisfactory dyeing will result. Attention to many details is the secret of success in dyeing rayon hosiery.

Yarn Tension Important in Plating Rayon

By Walter Simond

WHEN viscose yarns first began to be used for knitting purposes, we had a great many press-offs, caused by the filaments catching on knots and imperfections on the sides of the cones. Since the adoption of the method of placing the knots on the top end of the cones, excellent results have been obtained with these yarns, especially in combination with other threads of cotton, wool, or silk.

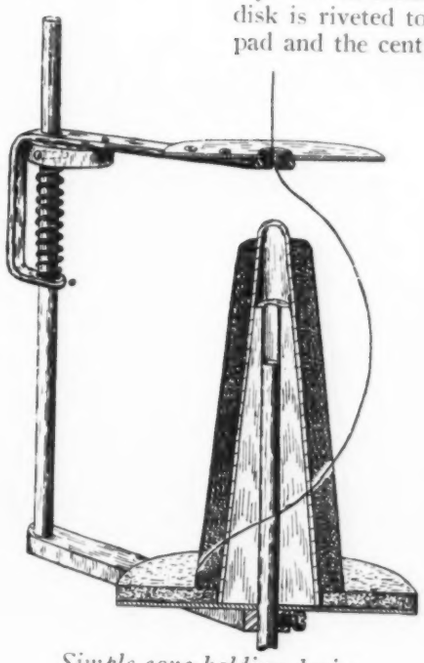
In order that best results may be secured, it is necessary to accord rayon special handling. The quality of a plated fabric depends very largely upon the method of holding the cones and of controlling the yarn tension. The purpose of this article is to discuss the methods used and to recommend means for obtaining the best results.

Circular knitting machines are particularly adapted for the difficult plating operation, since the needles operate in regular succession. Nevertheless, in order to secure perfect plating in plain knitting and to obtain perfect patterns in reverse plating, it is essential that every precaution be taken to secure correct conditions for the yarns on the bobbin stands. Bent bobbin wires and off-center take-off guides should never be tolerated. A very common mistake is the attempt to plate with a backing yarn which is much finer than the face yarn. The backing yarn has to be run with almost no tension; and our experience has been that the finer the yarn, the more likely it is to appear on the face of the fabric in flashes. A simple trial with contrasting colors will soon convince the most skeptical as to the better way of plating.

Holding the Cones

Cones with a medium taper are best for rayon, because the yarn is so smooth that cones having a large taper are easily slipped out of the packages in handling. Many of the present-day machines are equipped with a special cone holder for the rayon cones. The cones are held in a horizontal position and the take-off eye is placed approximately $1\frac{3}{4}$ in. from the top of the cone. This distance is used to secure a single, large balloon in the yarn during knitting. I believe the horizontal position was adopted to prevent the rayon from catching at the bottom of the cones. Very fine results have been obtained with the use of these holders. Another method is to set the rayon cones on thick felt pads such as are used under silk cones. These prevent the rayon from catching under the bottom edge of the cones.

A very simple holder can be made as illustrated herewith. The distance from the yarn to the eyelet is 1.75 in. The fiber disk which surrounds the eyelet prevents the rayon from catching on the eyelet arm. The lower fiber disk is riveted to the bracket arm and supports the felt pad and the centralizing wood cone. These holder units can be secured to any convenient bobbin wire and require very little space on the yarn racks. The arm of the holder is easily raised and swung out of the way when a new supply cone is needed—the arm being returned and dropped over the retaining pin. The cut is illustrative of the principle only, and the holders can be made to suit any size of cone. The writer prefers a diameter at the base not over 5-in. This position of the cones gives an absolutely even balloon, and is helpful in maintaining the even draft so essential for plating.



Simple cone-holding device

All tension devices for plating should be located as near as possible to the thread carriers in the latch ring. When these devices are located at a distance from the carriers, the vibration of the machine often causes a whipping action in the long spans of yarn between eyelets of the machine. This interferes with the plating of the yarns. The yarns should be separated as much as they can be, conveniently, at the throat plate in the latch ring. If the face yarn is well tensioned, it is usually advisable to tension the backing yarn very lightly to cause it to flow evenly to the needles—uniform tension being the best preventive of "flashes" in plated fabrics.

Preference is given to disk tensions having conical springs affixed at one end so that they cannot turn.

One of the most remarkable features in modern knitting machines is the fact that they can so accurately superimpose one yarn upon another throughout all the stitches of the fabric, in either plain or ribbed knitting.

Yerkes Anticipates Equal Volume of Rayon Demand for Rest of Year

"THE rayon industry has been giving an increasingly greater value per dollar year by year, both from the point of view of actual price and from the point of view of quality," states L. A. Yerkes, president, Du Pont Rayon Co. "The stability of the price of yarn during the last six months has undoubtedly made for a very considerable volume which the total production and consumption figures indicate. We look for at least as great a volume during the last half of the year."

Cheapening *Threatens Rayon Outerwear and Underwear*

By Southwick Hall

WHEN a comparatively inexpensive raw material is employed in the manufacture of an article, it is not surprising that other cheapening means are adopted as well. The manufacturer of such a commodity is trying to reach the consumer of moderate income, and he reasons that every reduction he can make in cost—and hence in selling price—is so much progress toward that end. Then there is always the type of manufacturer—whether we consider high-quality or low-quality merchandise—who must make his product a trifle inferior to that of his competitor in order that he may offer it at a lower price and appear to be underselling him. Others treat this man's product in the same manner, with the result that the quality toboggan is started on its inevitable slide. It is difficult to arrest its course before it slips below the last mile post of public favor.

Some such misfortune has overtaken rayon outerwear and is now biting at the heels of underwear. Eight years ago rayon dresses and suits were selling at a good price and were giving satisfaction. They proved conclusively that the synthetic fiber could be knitted into desirable outerwear. It was not long, however, before the public noticed that its rayon dresses were sagging. The fabric was sleazy, due to being knitted too coarse. The result is that the public now mainly tolerates rayon in outerwear only when it is mixed with yarns of other fibers, such as worsted or cotton. Novelty yarns containing rayon constitute one of the few pegs in outerwear to which rayon can at present comfortably cling.

In underwear a very notable attempt was made about a year ago toward raising the consumer's respect for rayon garments. This was the purchase by three rayon companies of the Rubenstein patent for run-resistant underwear fabric and the issuance of manufacturing licenses to only those knitters who would agree to maintain a specified quality. The response from the trade was not entirely so enthusiastic as had been hoped, and the consumer was not completely satisfied when she found that the annoying runs were in many cases merely replaced by holes. Some manufacturers found it possible to cheapen the fabric in spite of the license specifications. Perhaps it would have been better if the specifications had been drawn up on a basis of gauge and stitches per inch for a given yarn, rather than on a weight per yard.

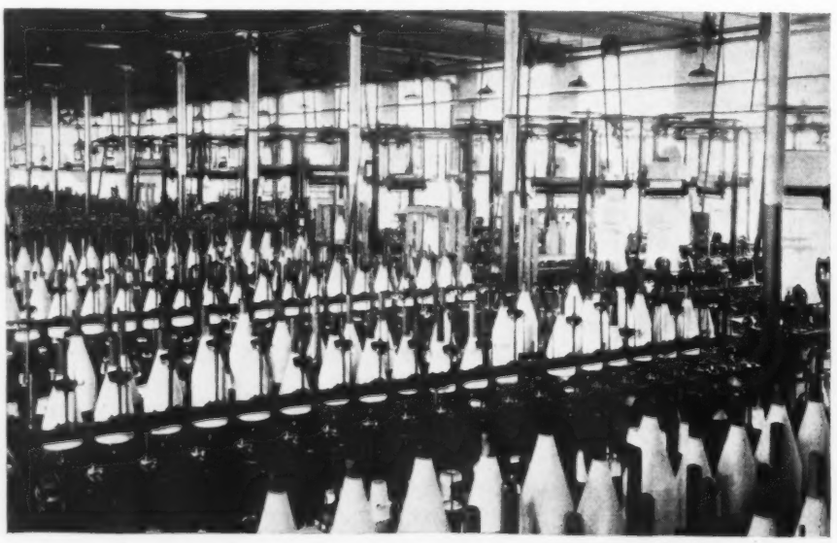
Establishment of Standards

The Associated Knit Underwear Manufacturers of America is making a worthy start toward establishing standards which are to include minimum specifications for quality of fabric.

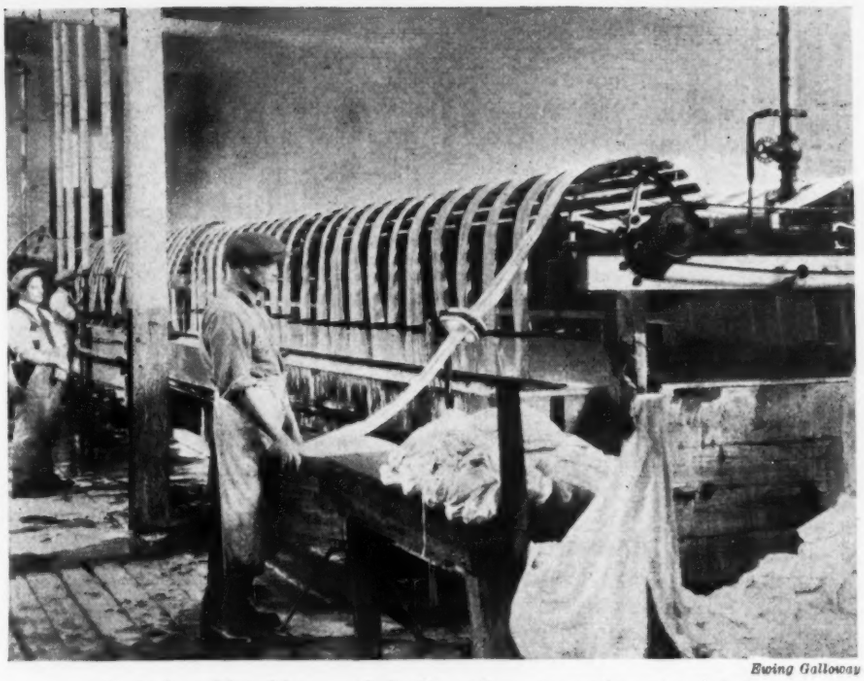
Some students of the rayon-underwear problem place their faith in the 1x1 rib as the type most likely to satisfy the consumer. This has run-resistant properties and is more elastic than jersey-knitted fabric. It is believed that less than one-third of the underwear fabric now being made is of the 1x1-rib construction. Some so-called 1x1-rib undergarments purchased by the unsuspecting consumer are found actually to be of that construction only in the trimming!

It is said that 70% of rayon knitting is in the winding. Assuming that that process is correctly conducted and that the knitting machinery is in good condition, no difficulties should be encountered by the intelligent outerwear or underwear knitter in working with rayon. But any assumption that the machinery of the average knitting mill is in good condition is a dangerous one. As a rule, knitgoods manufacturers are better at buying and selling than at maintaining the efficiency of their mechanical equipment. Too many operate their machines at an excessive rate of speed and then add insult to injury by neglecting their upkeep. They are also too slow in replacing machinery which has outlived its usefulness. Some have yet to learn that rayon is more exacting than other fibers in its demand on machine efficiency.

Little underwear and outerwear machinery is ever scrapped. Practically all of the equipment made inactive by closing down of mills is soon put to work again by other knitters. Recent studies of outerwear machinery by the Department of Commerce disclose that some machines have changed hands so many times that all records of their origin and date of manufacture have been lost.



Seventy per cent of the knitting is in the winding



Ewing Galloway

Scouring, bleaching, and dyeing of rayon underwear fabrics by the one-bath method has many advantages

One-Bath Method

for Scouring, Bleaching, and Dyeing Rayon Knit Goods Steadily Gains Favor

By George I. Putnam

A FEW years ago practically all knitted underwear cloth was scoured, bleached, and dyed in separate baths. This was true of fabrics composed of cotton, wool, or rayon, or of unions containing combinations of two or more of these fibers. With the increased use of rayon in underwear began the search for a more efficient method of wet processing. As a result of this, procedures were evolved which have been found suitable not only for treating rayon, but for all other materials used for undergarments; and today the one-bath method of scouring, bleaching, and dyeing is steadily gaining in favor.

Many Advantages

An outstanding advantage of the one-bath method—as contrasted with the older process of scouring, bleaching, and dyeing in separate baths—is the saving in time. Fabrics now can be wet processed in approximately one-third of the time which formerly was required. Due to this fact, there is less danger of damaging the rayon, and the goods have a better appearance and softer handle. Elasticity of the fabric is retained, shrinkage is lessened, and brightness of shade is unimpaired. Likewise, production is increased, and at the same time, labor and overhead costs are reduced. Worth-while savings in water are effected, and no greater amounts of chemicals are required.

Let us take a concrete example to demonstrate the practical application of the one-bath method: Load into an underwear dyeing machine of the reel type about 400 to 450 lb. of light-weight cloth in string or rope form. Run in sufficient cold water, and then start the machine. While the cloth is running in the cold water, add 8 lb. of trisodium phosphate. Mix together in a pail 2 qt. of pine oil and the same quantity of turkey red oil, and add this mixture to the bath. Next add, in powdered form, 12 lb. of sodium perborate.

Allow the goods to run cold in this bath for 5 min.; turn on the steam; bring the temperature to 180 or 190° F. Add the dyestuff which has been previously dissolved and strained. Run the goods for at least 1 hr., and take a sample for matching to shade. If the shade is not correct at the end of this time, addition of dyestuff may be made as usual. When the correct shade has been obtained, wash the fabric thoroughly with fresh water, unload, and dry.

Modified Method for Wool

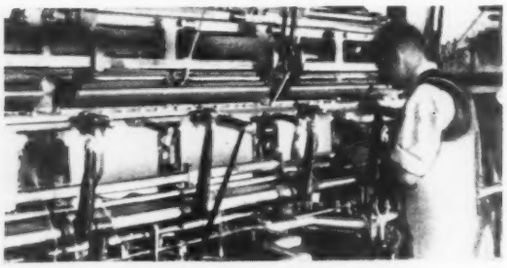
In using this method on fabrics containing wool, the amount of trisodium phosphate must be reduced to about 2 or 3 lb., and the temperature must be maintained at 130 to 140° F. If desired, a good grade of green olive-oil soap, previously dissolved in water, may be substituted for the trisodium phosphate. It is advisable, however, when running underwear cloth made up of cotton and wool, rayon and wool, or a combination of the three fibers, to use both soap and trisodium phosphate.

From this description of the process it is evident that the one-bath method is simple. It also is very efficient. The cost of the scouring and bleaching operation will run not over 1c. per lb. of cloth, and in some cases, not over ¾c. per lb. The savings effected and the superior finish obtained also must be considered.

One important precaution must be taken. It is essential to select dyestuffs which work well in combination with the perborate. If this is done, results obtained with the one-bath method will be satisfactory.

Rayon Has Made Strides in Warp-Knitting Industry

By Frank L. Bradford



Only within recent years have fine rayon counts been successfully used in warp knitting

THE use of rayon in the warp-knitting industry has greatly increased during the last few years, and it may be of interest to examine and note the many and diversified uses to which rayon has lately been put in that field.

Warp knitting embraces a rather wide range of machinery, each separate type of machine being constructed to carry out a specific assignment. The following may be classified as the more important: the milanese machine, fitted with an endless traverse of the warp threads; the tricot machine, carrying one, two, or three thread-guide bars; the flat bar machine with from one to six guide bars; the raschel machine with two latch-needle bars and from two to four guide bars; and the top jacquard string-warp machine with one and sometimes two spring-beard needle bars and two guide bars. There are also other types of warp machines designed for lace, net making, etc.

It is only within the last few years that the finer counts of rayon, say from 45 to 100 deniers, have been completely successful on this type of knitting machine. This is due to the fact that the producers of the various types of rayon have so improved their product that the difficulties formerly encountered have been reduced to a minimum. Indeed, the improvement in rayon yarns in the past few years has been remarkable; and it is now only necessary to handle rayon with reasonable care during the various processes, such as winding, warping, and threading, in order that it may meet with very excellent results.

While there is a difference in the various types of rayon, some being more adapted to certain purposes than others, it is only fair to say that all of them produce good results when properly applied in the field to which they are best suited. Experiments alone will show which is the best type of rayon for a particular warp-knitted fabric.

Milanese and Tricot

The milanese machine makes a good fabric using a 45- to 80-denier yarn, the latter number being the stoutest that can be safetly used on 28-gauge machine. When using 75- or 80-denier, difficulty may at first be encountered with the selvages. The left selvage may be addicted to falling off the needles; but this may be remedied by having the steel slideplate, down which the threads run, as high and as flat as possible. This prevents the threads from falling too suddenly.

At the right selvage the same method should be applied to the steel running plate. This will cause the threads to rise to the top level gradually and will prevent them from becoming too tight when reaching the switching blade. For anything coarser than 52-denier the sinker bar should also be adjusted to knock over a long loop stitch from the needles.

The tricot machine produces an almost endless variety of rayon fabrics, including two-bar plain jersey cloth of various types; one- two-, and three-bar nets; pattern laces; veilings; a great variety of single-bar underwear cloth; glove fabric; rayon-plated cotton fabric; wool fabric interknitted with rayon; and may others.

To insure success in warp-knit rayon fabrics, it is necessary to pay strict attention to the sinker- and needle-bar motions, and also to the thread tensions. These should be very elastic, having a clear movement of at least $\frac{1}{2}$ in., with fairly strong, soft springs. The sinker bar must knock over the knitted loop very evenly, the whole width of machine having the needle-bar cams in perfect unison when falling below the sinkers after pressing. These precautions must be taken because of the non-elasticity of rayon yarn, which is particularly noticeable when the threads pass over two needles, as is the case when making knitted lace on a double-needle basis.

The raschel string-jacquard machine with two needle bars is particularly adapted to rayon yarns, as the lace patterns it produces are constructed on a single-needle base. Having only half the gauge in the two needle bars and also the two guide bars, there is more space for the passage of the threads.

Rayon yarn should not be allowed to pass over anything that will put a chafing strain upon it. This applies to all the processes in its passage from spool or skein to the finished product.

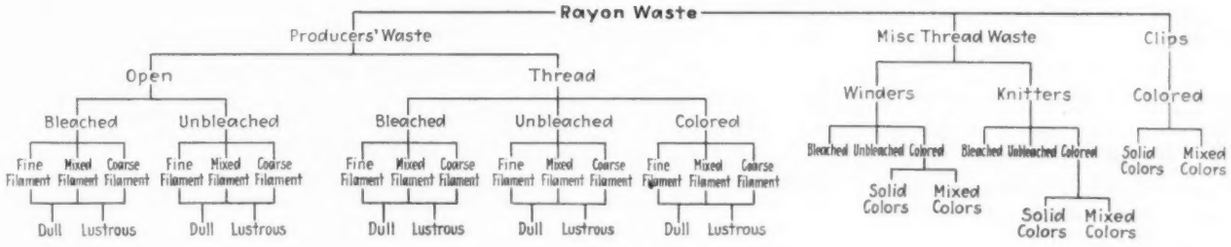
The present trend of warp knitting is toward more and more rayon, either alone or mixed with pure silk, wool, or cotton. One reason why warp-knitted rayon has become popular is that all the threads of a given denier are of a uniform thickness, producing a fabric that is free from the lines and tracings that are usually seen when pure silk is used. The latter material, during recent years, has had a tendency to vary greatly in thickness, although supposed to be the same denier throughout.

The writer first saw a sample of "artificial silk" made by Cross of London, England, run through a warp- knitting machine in the year 1893. From that time to the present, such progress has been made in the production and quality of the fiber that it bids fair to become a dominating feature in the warp-knitting industry.

Preparing Rayon Waste

for Use with Worsteds and Woolens

By Henry R. Woodward



RAYON waste is a by-product of either the rayon-producing plants or the users of rayon yarn. Due to its tangled condition and to the fact that it contains filament lengths varying from one inch to hundreds of yards, processing is required to put it in condition for use in the woolen and worsted industries. The fibers may or may not be placed in a parallel condition, as the use dictates.

The first operation, where necessary, is sorting. The purpose of this is to eliminate any metallic substances often found in the waste, as these would cause damage to the machinery or be the cause of fires. With some types of waste it is also sometimes necessary to sort for cotton tie-bands or threads. Where color is an important factor, it may pay to sort for shade, although the present extremely low price of the processed waste precludes much sorting.

If several distinctly different lots of waste are to be combined, the next operation will be blending. This is done in the picker room, and at its best simply consists of spreading the lots in layers on the floor.

As the waste is laid out on the floor, it is oiled—usually with an olive-oil emulsion or similar compound. This may be accomplished to best advantage with a pressure sprayer, which will atomize the emulsion and insure greater distribution on the stock. The object is not only to lubricate the fibers, but incidentally to prevent fires which would surely occur during picking were the stock not oiled.

The waste may then be fed to a picker, which will open up the tangled mass of long filaments and, by breaking them, will reduce the filament length. The picker, or opener, should preferably have a double set of fluted feed rolls, and, for open and thread waste, should have an extremely open set of pins. For clips a closer pinnage is preferable. As the pull on the feed rolls is very great, plenty of weight and leverage must be given, especially on the front rolls. The fiber length of the picker stock is regulated by several factors. The original length of the stock, the amount of oil, the feed-roll pressure, the pinnage of the cylinder, and the setting of the feed rolls all have their effect in this matter.

If the picking has been properly carried out, the stock is now ready for the card or garnett as the case may be. Some plants find that where the staple has not been shortened sufficiently, it is advisable to insert a cutting operation previous to carding or garnetting. It is well to avoid this if possible, as it is indiscriminate, making short fibers shorter and reducing the length of longer ones.

If the product is to be garnetted, it is now fed into the feed boxes of the garnett, which completes the work of separating and disentangling the fibers and which produces the familiar garnetted rayon wastes supplied to the woolen and worsted mills. When the picked stock is to be carded, it is fed to the card either by a Bramwell feed or, in many cases, by hand on a travelling feed apron—definite weighings being spread over a definite area of the apron to insure uniformity of feed. The card may be of the woolen type, but with chain-and-sprocket worker-drive; or it may be of the double-cylinder worsted type with gear-driven licker-ins and dividers, especially if the picked stock is of long staple.

If the stock is intended for use in woolens, in the natural staple length, it is now bagged and shipped. If, however, it is to be still further reduced in staple length, it is made into card balls and cut on a rotary cutter. A much better method is to give it one or two gilling operations to parallel the fibers; and then the ends from a number of balls may be fed into the cutter, where the staple may be reduced to desired maximum fiber length.

In the event that the product is intended for use in the worsted industry, it is gilled; and for yarns to be sold "at a price," it may be blended at once with the worsted sliver or top, drawn without combing, and spun into yarn. Naturally, the short fibers and nibs which it contains are not desirable, and this procedure is not recommended unless the yarn or goods are to be dyed a solid color. Even then the results are often quite unsatisfactory, due to slubs and uneven yarn.

If blends with worsted are to be made, the blending may be done prior to carding or in the gilling before combing; but it is best to do the blending before combing where possible if the quality of the top and yarn is important, though the noil is reduced in value.

The usual routine of gilling, combing, and gilling is followed when the final product is to be top. Where rayon top for the French system of worsted spinning is to be made, a maximum fiber length of 5½ to 6 in. is desired. This is obtained either by buying waste cut to length by the producers; or by following the procedure of carding, gilling twice, cutting to 5½-in. lengths, recarding, gilling twice, combing, and gilling.

Spinning Rayon Staple *on the Cotton System*

By Frank Holden

Head of Carding and Spinning Department
New Bedford Textile School

WHILE the manufacture of rayon-staple yarn is not new, there are many cotton mills which would undoubtedly run this material if they were sure that they could handle it successfully on their present cotton machinery.

Some time ago a Massachusetts cotton mill inquired of the writer if it were possible to run rayon staple without having to purchase special machinery. In order to give the desired information, several mills which had had experience in this line of work were visited and their methods discussed. Finding quite a difference of opinion as to the best methods to use, it was decided to get in touch with the manufacturer of this staple, secure a sample lot of fibers, and put them through the manufacturing processes as a practical test. Valuable aid in carrying out the test was given by R. H. Fisher and E. S. Porter of the Du Pont Rayon Co.

It should be understood that rayon staple is not a rayon waste, but is made on specially designed machinery and is a quality product. This staple is cut into 1½-in. lengths and is 1.5-denier. It has been found that this weight gives the best results, other weights giving trouble in the course of manufacture, especially at the card. The following procedure was suggested by the Du Pont company.

Suggested Layout

Opening Machinery. The machinery for opening and lap-forming consists of a hopper feeder combined with a single beater section and lap head. Four lap feeders for doubling may also be used, if necessary. This section is fitted with an 18-in. porcupine cylinder instead of a blade beater, because the action required is more that of combing than of beating. Grid bars under the cylinder are dispensed with and plain metal-sheet is substituted to prevent all possible loss of fiber. A loose tube should be fitted over the lap roller; since, owing to the tenacity of the material, it would otherwise be found difficult, if not impossible, to withdraw the lap from the roller.

Carding. The setting for 1½-in. rayon staple would be: licker-in to feed plate, .010 in.; licker-in to cylinder, .010 in.; cylinder to flats (all round), .010 in.; cylinder to doffer, .007 in. The cylinder speed should be approximately 170 r.p.m. and the doffer no faster than 9 r.p.m.

The only differences of importance between this card and the ordinary cotton card are as follows: Mote knives are dispensed with entirely on the former. Blank undercasings are used under the licker-in to prevent loss of fiber. Calender rolls are speeded up in order to pick up more quickly. The top flats are arranged to run "dead slow," say 1 in. in three minutes.

The sliver is to weigh about 60 grains per yard. No selvage guides are necessary. Fairly fine, dull wire (about 120s cylinder, 130s doffer and flats) is required.

Drawing Frames. Approximate roller settings for the drawing frames are back to third, 2 1/16 in.; third to second, 1¾ in.; and second to front, 1⅝ in. One head of drawing is sufficient, as too much drawing tends to cause licking. Whiting tends to reduce the licking, but it must be noted that too liberal use impairs the luster of the material. Bone guides should be applied. Sliver is to weigh about 60 gr. per yd. (.138 hank sliver.).

Slubbers. Approximate roll settings for slubbers are: front to middle, 1 1/16 in.; middle to back, 2 in. In all fly frames the top roller should be set slightly ahead of the bottom roller to allow the twist to run into the bite of the rolls. Bone guides should be applied to the slubber. It is also advisable to plate all parts with which the fiber comes in contact; e.g., spoons, guides, trumpets, roving rods, etc.

The weights for slubber are: back roll, 8 lb. 6¾ oz.; middle roll, 12 lb.; and front roll, 14 lb. The hank at slubber is .55; the draft, 4; twist per inch, .78 √ Hank. The back top roller is of smooth, polished iron; the middle and front rolls are coated with ordinary red varnish. The spindle speed is 480 r.p.m.

Intermediate Frames. Approximate roll settings for the intermediate frames are: front to middle, 1⅝ in.; middle to back, 1⅝ in. Weights are: back roll, 5 lb. 14½ oz.; middle roll, 10 lb.; front roll, 12 lb. Other details are: hank roving, 1.40; draft, 5; twists per inch, .78 √ Hank; spindle speed, 740 r.p.m.

Fine Frames. Approximate roll settings for the fine frames are: front to middle, 1½ in.; middle to back, 1⅞ in. The weights are: back roll, 2 lb. 14½ oz.; middle roll, 12 oz. (self-weighted); front roll, 7 lb. Other details are: hank roving, 4.00; draft, 6; twists per inch, .90 √ Hank; spindle speed, 1,200 r.p.m.

Ring-Spinning Frames. It is quite possible to spin staple fiber on the ordinary three lines of rolls, but it has been found that the four-line system of long drafting is most suitable. It is quite noticeable that the less the fiber is handled, the better is the luster. Therefore the long drafting tends to assist in obtaining less handling. For the lower counts and when using single roving, the intermediate frame can be dropped, thus saving one process. The fibers are also easily controlled by the light-weight second top-roll. For the four lines of top rolls, the following settings were suggested: front to second, 2 3/32 in.; second to third, 2 1/32 in.; third to back, 1⅝ in.

Suitable roll diameters are: front, 1 in.; second, ⅝ in.; third, ⅞ in.; and back, 1 in.

A weight of 21 lb. on the front rollers is advisable. For ring frames of 2½-in. space, a 1½-in. ring with no separators is required. Other recommendations are: spindle speed, 8,500 r.p.m.; turns per inch in warp, 3.25 √ count; turns per inch on filling, 3 √ count; count, 28; draft, 14.

Layout Used

These suggestions were not followed closely as the recommended machinery was not available. The first lot was run through a double opener, which consisted of an automatic feeder, porcupine beater, two-blade beater, and lap-head section. Finding that the lap contained fibers which were not entirely opened, another lot was run, first putting it through a roving-waste opener; and a good lap was the result. While the Du Pont company recommended covering or replacing the grid bars with sheet metal, this method was not used, and only a small amount of lint was recovered from under the machine. This could be overcome by speeding up the fan.

The Du Pont company did not offer any suggestions with regard to moisture, but this is essential in the picker room and at all subsequent operations. While moisture has a weakening effect on rayon, it is a good medium for overcoming static electricity.

Laps of 16-oz. weight were made on the opener, and four of these were run on a finisher picker with evener motion and a two-blade beater. The finisher picker was treated the same as the opener, the grid bars not being covered or removed and plenty of moisture being applied. Another thing is very evident—viz., that some

type of split-lap preventer is required. A paper cover was fitted to the lap roller to assist in its removal.

The lap from the finisher picker was run through a regular card, using all the regular cotton settings and speeds with the exception of the speed of the flats. The small driving pulley was removed from the cylinder shaft, and the flats were driven directly from the shaft, being run as slowly as possible. The licker-in casing and mote knives were not removed. A 60-gr. sliver was made at the card, and no difficulty was experienced in running this machine as long as there was enough moisture in the room. It was not found necessary to change the speed of the calender roll.

Following carding, two processes of drawing were employed. Different weights per yard were tried in order that the best running condition might be obtained. Sliver weighing 60 grains per yard gave the best results. Bone selvage-guides were used to advantage. Moisture again was a factor in running this machine.

The following roll settings were used: first to second, $1\frac{5}{8}$ in.; second to third, $1\frac{3}{4}$ in.; and third to fourth, $1\frac{7}{8}$ in. The front roll was $1\frac{3}{8}$ in. in diameter, and the speed was 320 r.p.m. From this 60-grain sliver a .75-hank roving was made at the slubber, followed by a 2.20-hank on the intermediate. This was made into 24s counts at spinning, using double roving. From these hanks the draft used on each machine would be: 5.4 on slubber; 5.86 on intermediate; and 21.8 on spinning.

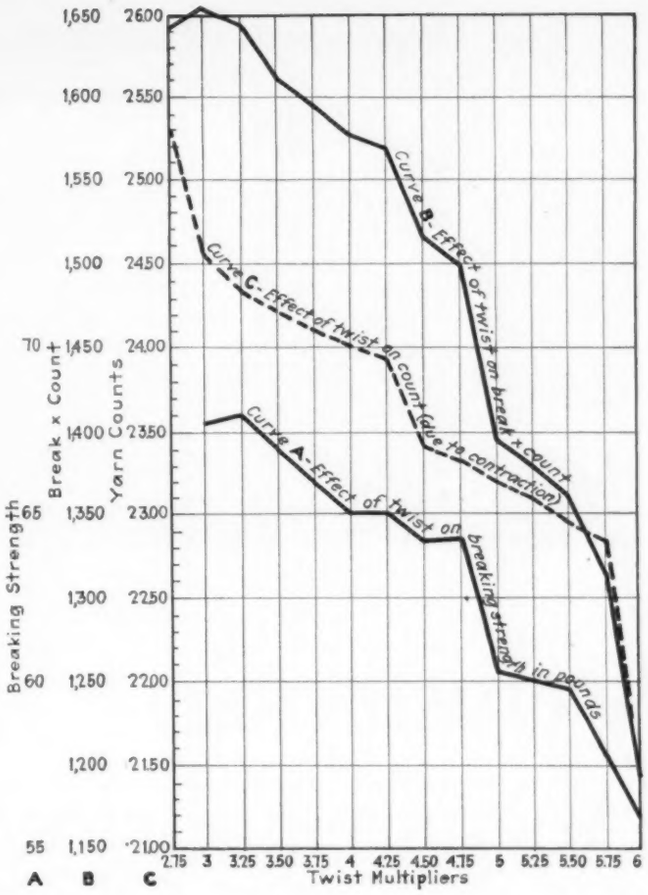
The roving twist used was as follows: slubber, .65; intermediate, .707. On the spinning, the twist was varied to show its effect on the rayon staple, starting with 2.5 as a twist multiplier and going as high as six.

The roll settings on the slubber and intermediate were the same: front to middle, $1\frac{5}{8}$ in.; middle to back, $1\frac{3}{4}$ in. On the slubber, shell rolls were used on the front top line, and the middle and back were solid, each line weighted separately. Shell rolls were also used on the front top line of the intermediate, and the middle and back were solid. The front rolls were weighted directly and the middle and back were weighted by saddle.

Several types of rolls were tried. The best results were obtained by using leather-covered rolls in back and front, and a light-weight middle roll made of wood and covered with leather. Several different counts were spun, using both single and double roving in the creel to show the effect of draft on the fiber. In this respect, rayon staple compares favorably with cotton, the amount of draft which may be used being governed by the evenness of the roving in the creel. It was noticed that, as the amount of twist was increased, the amount of luster diminished, and that in the extremely hard-twisted yarn there was no luster.

The accompanying curves show the results of several tests on 24s rayon staple made from 2.20-hank in the creel, using two doublings and a draft of 21.8. Curve *A* shows the break in pounds of 120-yd. skeins using the different twist multipliers. The yarn was tested on a power machine, the pulling arm going at the speed of 12 in. per min. and running under regular conditions as to humidity, etc. All tests were made at one time, without conditioning the yarn. Curve *B* further illustrates the breaking strength. By multiplying the break in pounds by the counts, a standard is given which shows the relative strength. Curve *C* shows the effect of twist on the weight or count of the yarn. It will be noticed that the highest breaking strength was with the twist multipliers of from 3 to 3.25.

Certain observations made during the running of this staple may be of interest. At the opener a fairly light


Curve B - Effect of twist on break x count
Curve C - Effect of twist on count (due to contraction)
Curve A - Effect of twist on breaking strength in pounds
Breaking Strength
Break x Count
Yarn Counts
Twist Multipliers
A
B
C

Effect of twist on the strength, count, and product of strength times count of 24s staple-rayon yarn. Each curve is to be measured by an individual vertical scale at left.

feed is required, or a very heavy lap will be made. A split-lap preventer is essential, as also is moisture in the air. Care should be taken not to allow moisture to come into direct contact with the rayon staple, as the fibers will form a sheet almost like paper. It was found advisable to make a "soft lap"; that is, the pressure racks were not used.

On the card there was a slight amount of slackness between the doffer and the calender rolls. This was overcome by raising the position of the doffer comb. Very little difficulty was experienced at the coiler. There is a tendency to plug up, especially if humidity is low. It is necessary that the tube gear be perfectly clean and smooth. This observation also applies to the drawing frame.

On the slubber and intermediate, spindle speeds should be lower than what is considered normal for cotton. Due to the low twist required, a fairly high front-roll speed will result. If a high spindle speed is used on the slubber, the roving is liable to split as it leaves the front roll and cause many breaks.

At the spinning frame no difficulty was experienced, the rayon staple being equal to or better than cotton. Very few ends were down.

The following is a list of machines used in running these experiments: Kitson opener and finisher, Whitin and H & B Cards, Woonsocket drawing frame, H & B slubber, Whitin intermediate, Fales & Jenks spinning frame.

In conclusion, let it be remembered that this is the result of one of a series of tests and not conclusive.

Crepe-back satins, after delustering, may be dyed in reel machines

Delustering Acetate Fabrics

with Special Reference to Crepe-Back Satins

By John Sterling

WITH the increased demand for subdued effects, the delustering of fabrics containing acetate yarn has assumed greater importance. As a result, numerous methods have been proposed for producing a low-luster finish; and in the case of crepe-back satins with an acetate warp and silk filling, a procedure has been developed which gives particularly good results.

Process Is Simple

The process employed is comparatively simple and is easily controlled. Quite probably it could be modified to give comparable results on other constructions. When applied to crepe-back satins, however, the treatment serves the double purpose of delustering the acetate yarn and degumming the silk.

To prepare the fabric for delustering it is first hooked off into 36-in. folds. Strings are next passed through the selvages—one near each end, and one at the middle of the fold. About three to five folds are taken in with each string. The strings are tied into loops about 10 to 12 in. long. As each set of three loops is completed, a maple stick 1 in. square is passed through the loops and the set is put aside to make room to work on the next set. When a piece is completed, it is laid up on horses to await completion of the lot or color, and transference to the boil-off tubs. The boil-off tubs employed are the conventional silk boil-off vats, and usually are about 12 ft. long, 5 ft. wide, and 5 ft. deep.

Boiling-off of these fabrics must be conducted with some care. An excessive amount of alkali and too prolonged a treatment must be avoided. Failure to take these precautions will result in saponification of the acetate warp, with resultant uneven dyeing. Accordingly, only tested boil-off materials of known alkalinity should be used. Prepared boil-off oils, particularly, must be examined carefully. Many of these will not be at all suitable, as they are made for degumming silk, and are entirely too alkaline for use with cellulose acetate (although excellent for their intended purposes).

Degumming the Silk

The writer prefers a good green olive-oil soap. This must contain, at the most, only a trace of free alkali. It is sometimes advisable to add a small amount of soda ash or modified soda to the bath, which tends to maintain the original pH value as the stripping progresses.

The actual boil-off and delustering procedure is as follows: The pieces, suspended by the maple sticks which are long enough to reach well over the side of the vat, are hung in the tub. The first treatment is in warm water at a temperature of about 100° F. The temperature is raised gradually to 120° F. This treatment serves to wet out the fabric and remove such soluble materials as may have been used in sizing the warp.

The pieces are now laid up at the end of the tub on the sticks, and 8 to 10% of olive-oil soap (based on the weight of the goods) and 1 oz. soda ash per 30 gal. of liquor are added to the water used for wetting out the goods. (These amounts are based on a fabric containing a filling which is roughly one-third silk.)

The goods are entered into the soap bath at about 120° F., and the temperature is raised gradually to at least 175° F. The sticks are moved constantly from one end of the batch to the end of the tub. It is well to have at least 3 ft. of leeway to allow ample circulation and movement.

At the end of the first hour the degumming of the silk should be almost complete. A quick test of this is to take a silk thread and untwist it. If the filaments separate, the degumming is complete.

Delustering Commences

When a satisfactory boil-off has been obtained, the temperature of the bath is raised to 185 to 195° F. Delustering of the acetate warp will commence, and from now on care must be taken that this effect does not progress too far and that saponification does not set in.

Simple tests of these conditions may be made as follows: Samples are taken from each end and the middle of the lot, rinsed, dried, and examined for the extent of deluster. Comparison with previous standards, if available, is good practice. The same samples may be tested for saponification by dipping them in a solution of Erie Sky Blue 6B, or a similar direct dye. If, after rinsing, a distinct dyed effect is observed, the goods are partially saponified and must be rinsed immediately. Delustering, once started, progresses with rapidity; and the first sign of affinity for direct colors is the danger point. A stain which rinses out easily is no cause for concern.

Usually treatment for about 30 min. at the elevated temperature will give a distinct deluster, which in many cases will be sufficient. The temperature may, if necessary, be raised to 200° F.; but it is safer to have the process under better control by keeping down the temperature to just the point which affects the luster.

If a batch shows signs of saponification, and the silk is degummed, but the luster is still too high, a fresh bath of water alone heated to the required temperature will serve to deluster without running great risk of further saponification. It must be borne in mind, however, that water alone will damage acetate yarns if permitted to react on them long enough and at high temperatures. Therefore this further treatment will also bear watching.

Further Experiments

When the goods have reached that condition where the luster is at the right stage, they should be rinsed and dyed in the regular way. It is more economical to make up a standing boil-off bath and to transfer the goods to another tub for dyeing. The delustering bath can be used for three or four batches, although an addition of soap may be necessary.

For the prevailing mode shades, the delustered effect comes through the dyeing operation unaffected. For very deep shades, the deluster has a tendency to lose its flatness, and the goods regain a portion of their luster. This may be taken into consideration, and the delustering carried further than is actually wanted in the finished goods. In the case of blacks there is difficulty in retaining much of the delustered effect, but experiments are being carried out which indicate that a satisfactory method will soon be available.

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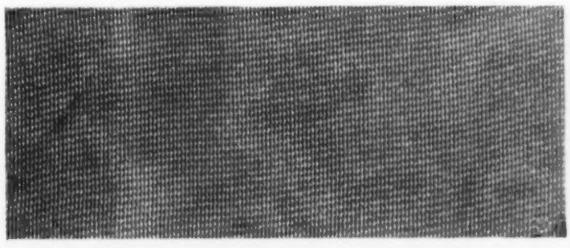


Crepe lining fabric—cellulose acetate warp; real silk filling

Recent Developments in Handling Acetate Crepes

MORE extended use of acetate linings having a crepe weave has caused the finisher to exercise considerable ingenuity in devising methods for scouring, delustering, and dyeing these fabrics. Due to the fact that the crepes may consist wholly of acetate yarn or may have an acetate warp with either a viscose rayon or a real-silk filling, it has been necessary to work out a number of processes.

General procedure, however, is to follow the long-standing real-silk practice of "stringing" the pieces in book form and crepeing and degumming in regular boil-off vats; dyeing is then carried out in reel machines. Advantages of this method are that the fabric is not exposed to tension or friction while in the open width, and that the acetate may be delustered satisfactorily, as the fabric is totally submerged during the scouring operation.

Other methods, perhaps not so tedious as the above, have been evolved which are more adapted to the peculiarities of acetate fabrics. For example, the goods may be padded in a warm solution of a detergent swelling agent (such as an emulsion of xlyol and sulfonated castor oil soap), plaited into trucks, and allowed to lie in the open width for about 1 hr. This procedure enables the acetate yarn to be wet out thoroughly and the crepe to be set uniformly and without friction or danger of breaks.

Another process recently introduced makes use of the ripple washer, which is essentially an endless open-mesh screen upon which the fabric, after padding, is fed continuously in the open width and is subjected to spraying with hot or cold water. The goods are then transferred to the reel machine for scouring and dyeing.

Efforts have been made by a number of finishers to develop other continuous delustering processes, but further work in this direction is needed.

A fourth method, following velvet practice, makes use of the star machine, or dipping frame. The fabric, to the selvages of which tapes may be sewed if necessary, is wound spirally on a framework which is capable of being lowered and rotated in a suitable bath. This procedure permits the goods to be creped, degummed, delustered, and dyed in the same machine.

Progress in Finishing

Keeps Abreast of Greater Demand for Acetate Lining Fabrics

By J. E. Anderson

RENEWED interest in processing rayon lining fabrics has accompanied the increased demand for these materials which has been evidenced in recent months. The popularity of acetate linings is due, first, to the inherent properties of cellulose acetate yarns; and secondly, to the advances which have been made in dyeing and finishing fabrics composed wholly or in part of these products. These improvements of late have been in the nature of refinements of existing methods, rather than the introduction of entirely new processes. As a result of this steady progress, however, the finisher of acetate linings is able to turn out products which are more satisfactory in appearance and serviceability than hitherto has been possible.

Cellulose acetate lining fabrics may be divided into two classes according to the type of machine on which they are scoured and dyed. The first group—which includes satins, taffetas, failles, twills, and brocades—should be scoured and dyed on the jig. The second group—which comprises all the crepe fabrics—should be processed in boil-off vats or on reel machines. The following details apply only to lining fabrics included in the first group. [Processing of acetate crepes is treated on page 117.—*Editor.*]

Thorough Scouring Essential

Although the acetate yarn in lining fabrics generally contains very little foreign matter other than gelatin and a small amount of plasticizer, this is no reason why the scouring operation should be curtailed in the least. Rather, this type of filament, being very slow to wet out thoroughly, should be given every opportunity to swell and assume its maximum diameter. This may be regarded as one of the "secrets" of finishing cellulose acetate lining fabrics; and insufficient scouring may give rise to "barre" effects and streakiness.

Swelling is often accomplished by padding the gray goods through a warm solution of a detergent swelling agent, such as a solution of xylol in a sulfonated castor-oil soap. The goods, after padding, are wound on rolls, covered to retain the heat, and allowed to lie overnight. They are then scoured on the jig. A scouring procedure which is recommended for fabrics containing a viscose warp and acetate filling is as follows: One end, cold water; two ends, warm desizing solution; one end, water at 180° F.; four ends, 2 lb. soda ash (or equivalent of trisodium phosphate), 6 lb. olive-oil soap, and 2 lb. emulsified solvent in 60 gal. water at 185° F.; one end, hot water; and two ends, cold water. In the case of all-acetate fabrics, the two ends in the desizing solution may be omitted.

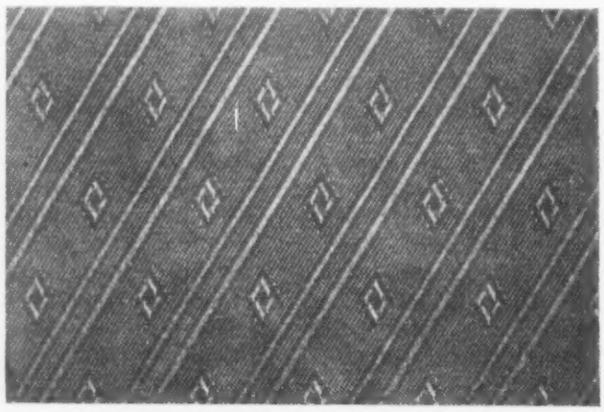
Avoid Creasing

Cellulose acetate, like wool, is quite plastic at temperatures in the neighborhood of 180° F.; therefore any creases, formed under such conditions during scouring and dyeing, will be practically permanent. It is obvious that jigs on which the fabrics are scoured and dyed should be run at cloth speeds (about 45 to 50 yd. per min.) which do not promote the formation of creases. All rollers should be parallel and as frictionless as it is possible to make them. Expander bars are frequently a somewhat mixed blessing; but if care be taken to avoid excessive tension, they are undoubtedly useful in preventing creases.

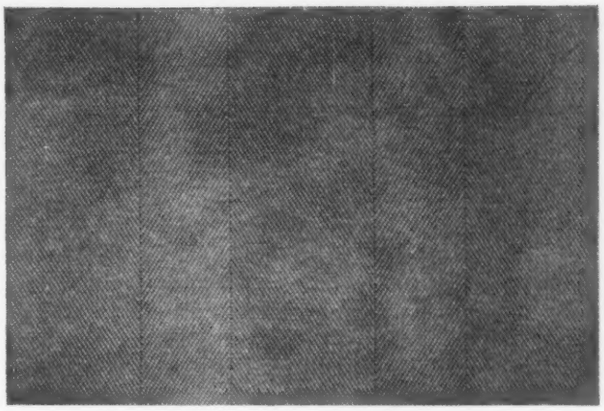
In the event of goods being badly creased, the only possible remedy is to run the goods through a warm solution of a detergent swelling agent, such as that mentioned previously, shell up, and allow to remain overnight. The goods are then stretched on the tenter, using steam where available. This process may need to be repeated once or twice according to the severity of the creases.

In the same way that cellulose acetate yarn is comparatively slow to wet out, it is also difficult to rinse free from the extraneous matter dispersed in the scouring liquor. The efficiency of the rinsing operations may be increased by fitting the jig with two sets of double perforated pipes so that the fabric passes between the pipes of each set, thereby receiving a spray of water on both sides of the material.

Extreme care should be exercised in the making of seams to see that they are flat and not under tension.



Lining fabric for men's wear—cellulose acetate warp; viscose rayon filling



Twill lining fabric—viscose rayon warp; cellulose acetate filling

Likewise, end cloths of the correct width and composition must be used. When possible, end cloths consisting of remnants of acetate fabrics should be employed. Alternatively, strings attached to the ends of the lining fabric itself are frequently used to avoid end losses.

If acetate lining fabrics are to be iron-proofed by the caustic method, they are best treated in the gray state, as it is possible to produce a superficial saponification without affecting the affinity of the cellulose acetate for its special type of colors. Addition of a small amount of a swelling agent, such as phenol or alcohol, to the caustic solution is often beneficial.

To increase resistance to hot ironing, a method has been patented recently whereby fabrics are treated with an alkali to partially saponify the cellulose acetate and then with stannic chloride and sodium silicate or other weighting agents. It is stated that fabrics processed in this manner may be ironed safely at temperatures considerably higher than can be employed with goods treated only with caustic.

Dyeing Acetate Fabrics

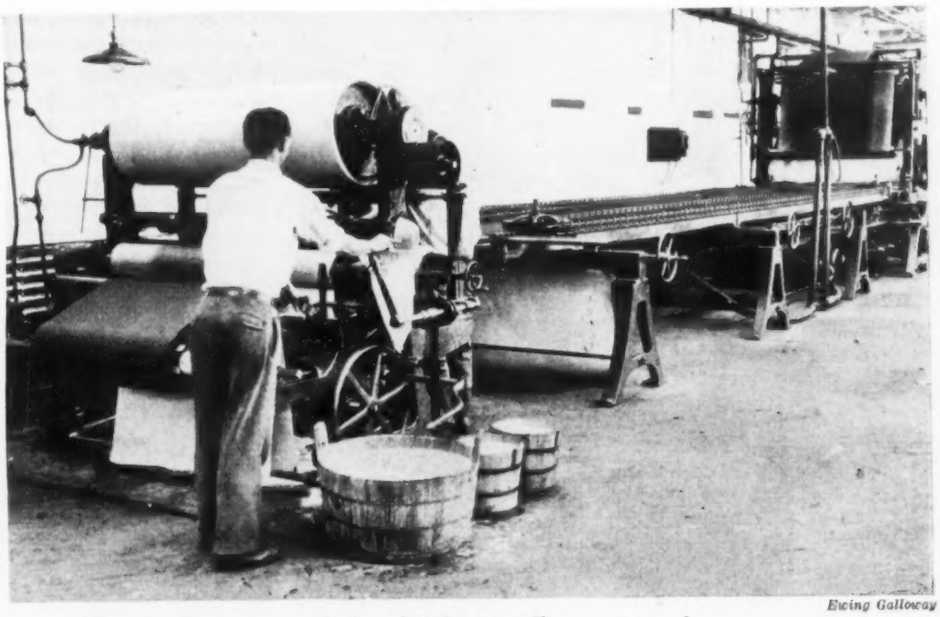
Many of the problems formerly encountered in dyeing acetate linings have now been solved. There is available practically a full range of dyestuffs, whose application is simple and fastness on a par with that of many vat colors. For linings containing viscose rayon, the best of the direct colors are satisfactory for light and certain medium shades; but for other medium shades and all heavy shades, developed colors should be used. The chief difficulties likely to be encountered are in exhausting the dyebath and avoiding dark or shaded selvages.

In general, acetate colors exhaust well, provided sufficient time is allowed. On the other hand, if dyeing is prolonged, there is a proclivity, as in vat dyeing of cotton on the jig, to form dark selvages. The writer overcame this difficulty by using a standing bath for heavy shades, although care had to be taken with subsequent lots to start dyeing at 110° F., and to raise the temperature gradually to 185° F. Any tendency of the dyeing machine to form slack selvages must be corrected; otherwise the edges of the cloth will be dyed a heavier shade than the rest of the fabric.

When dyeing nigger brown, which is obtained from a mixture of the three primaries, it is earnestly recommended to employ only those colors of the same type (anthraquinone derivatives), which exhaust proportionately under varying conditions of temperature. Considerable trouble was experienced at one time with reddish selvages on this shade of brown. The defect was finally traced to the use of an azo red which exhausted better at low temperatures than did the other components. Since the selvage was several degrees cooler than the interior of the fabric, the red exhausted more rapidly, giving rise to the defect.

Procedure After Dyeing

A cold rinse after dyeing is necessary; this operation may appear to be insignificant, but its omission often leads to trouble. As previously mentioned, acetate yarn is plastic at elevated temperatures; and if the fabric were taken off the jig while still hot and two or three other rolls placed on top of it on the stillage, there would be a distinct danger of the material being watermarked. For similar reasons, the roll should not be wound too tightly after dyeing. In drying acetate linings, to preserve the soft handle and luster and to prevent the fabric from being exposed to undue tension, use of dry cans usually should be avoided. Therefore the dyed goods should pass from the vacuum extractor through a mangle, containing the dissolved or emulsified softener, and onto a 90-ft. tenter, drying taking place at a rate of about 35 yd. per min. For lining fabrics with a viscose warp and acetate filling it is sometimes beneficial, however, to pass the goods over a stack of five drying cans connected with the tenter. Although it is not always necessary, as a final finishing operation, acetate lining fabrics frequently are given a light nip on a silk calender and a run over the button breaker.



Ewing Galloway

After dyeing, acetate lining fabrics usually are passed over a vacuum extractor, through a mangle containing a softener, and onto a tenter

Caustic Treatment Is Recent Development in Processing Rayon Crepes

By C. A. Jennings

DUE to the great variety of rayon crepes which are now being manufactured by the different mills throughout the country, it is impossible to confine the processing of these fabrics to one or two standard methods. In fact, each construction and make of crepe may require a different treatment. It is always advisable, therefore, to do considerable experimenting with sample pieces or swatches to determine the method which will produce the best results. When the proper procedure has been determined, it can be adopted as standard for that construction and manufacturer.

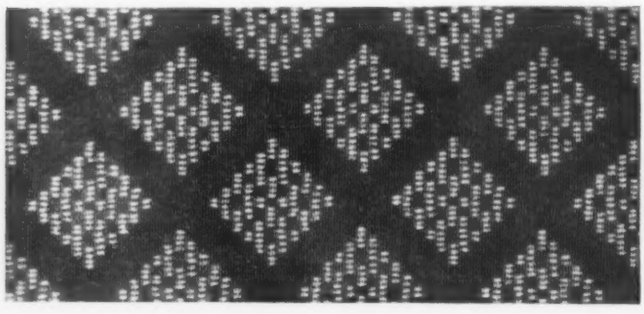
It is not the intention to list all the variables which confront the dyer and finisher, but rather to call attention to some of the more recent developments and to outline the general methods employed at present for processing the more common types of all-rayon and cotton-rayon crepes. In most cases the better grades of all-rayon crepes have developed into two major constructions. The better qualities vary somewhat as woven by different mills, but usually run about 39 to 43 in. wide with 112 to 124 ends per in. in the warp and 60 to 76 picks in the filling. They weigh from 5 to 6 yd. to the pound. The poorer grades are made from coarser yarns, are 39 to 40 in. wide, have from 88 to 100 ends per in. in the warp and 48 to 64 picks in the filling. As a rule, the crepe twist is in the filling. While 150-denier, 40-filament yarns are used in many instances, this does not always hold true.

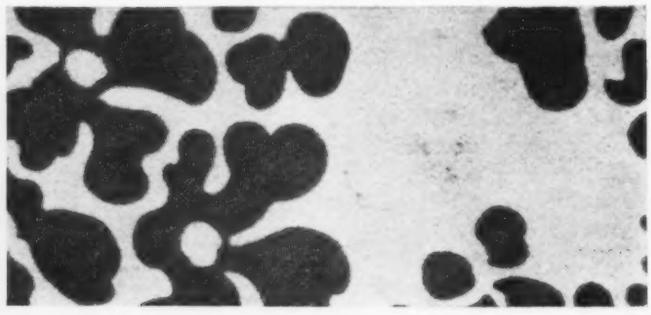
Preliminary Treatment

Very light crepes, such as chiffons and georgettes are given the preliminary crepeing treatment by the so-called stick method similar to that employed for real-silk fabrics of the same nature. A string is threaded through the selvage, passing through four or five thicknesses of cloth at each end of the laps. On heavier constructions strings are necessary also in the middle of the lap to prevent the cloth from sagging at the center. The strings are tied to make loops about 8 in. long. A stick about 1 in. wide and ½ in. thick, or a bamboo pole, is put through one set of loops across the piece, and the cloth is suspended in the solutions in which it is to be treated. The sticks are long enough to extend 6 to 8 in. over the edge of the tub. The tubs, or tanks, are rectangular in shape and are about 40 in. wide, 40 in. deep, and 10 to 20 ft. long. Several tanks are arranged end to end, each containing a different solution. The operator handles the sticks, holding one piece at a time, and submerges the cloth in the first solution, then in the second, and so on. If only one or two tanks are available, the solution can be drained off and the second solution put in while the crepe on the sticks is suspended above the tank.

The purpose of the first wet treatment is to set the crepe and to cleanse the fabric as much as possible without injury either to the twist or the goods. The solutions and strengths of solutions which are used vary with every finisher and also with different fabrics. In some cases the cloth is entered into cold water which is gradually brought to a temperature near the boiling point. It is then treated for ½ to 3 hr. in a desizing solution to soften and partly remove the starches, gums, and other sizing compounds used in preparing the yarns for weaving. After washing, the fabric is scoured at the boil for about 1 hr.

The scouring solution consists of a good grade of neutral soap, an emulsifying agent, and sometimes a small percentage of soda ash. The pieces are then washed; the strings removed; and the goods hydro-extracted, sewed end to end, and transferred in rope form to reel dyeing machines. Treatment in the reel machine consists of another scouring (if necessary), bleaching with hydrogen peroxide or sodium hypochlorite for whites and light shades, and dyeing with suitable colors. Choice of dyestuffs depends largely on whether



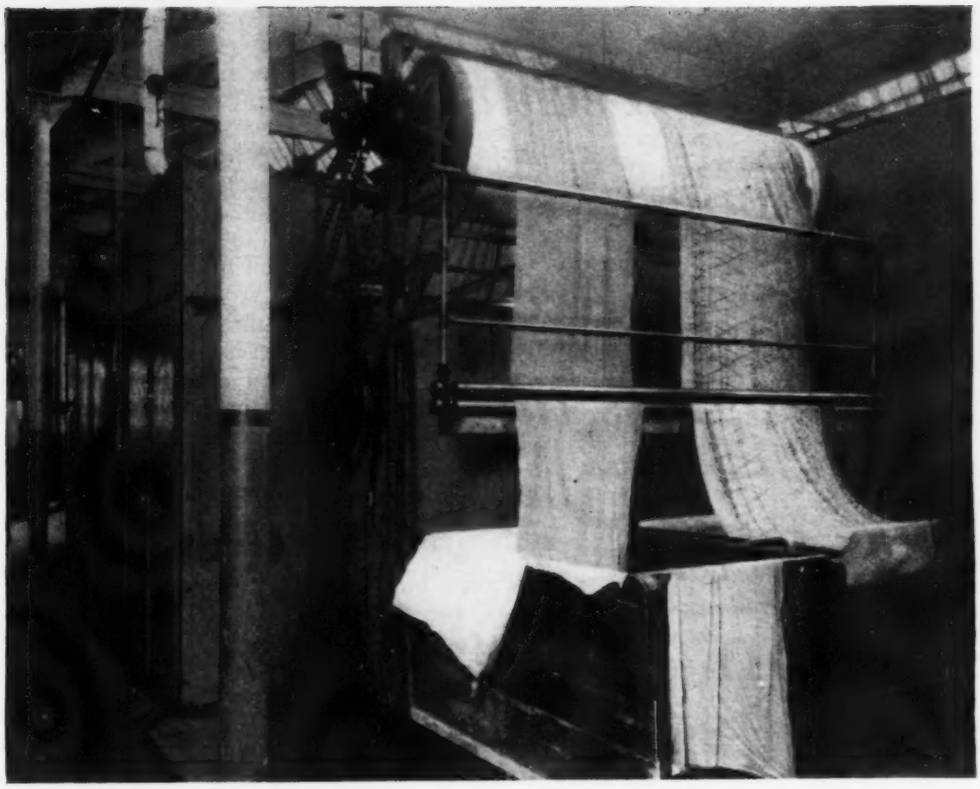


A group of rayon crepes showing various effects produced

the goods are to be finished in solid colors or are to be discharge printed.

On some grades of the heavier crepes, and especially on cotton-and-rayon fabrics, satisfactory results can be produced only in the dashwheel. In this machine the goods are treated with cold water, desized, and scoured. Since the whole piece is loose throughout the treatment, all the crepe take-up that is possible is permitted. Subsequent operations can be performed in rope form on the reel dyeing machine. After dyeing, the pieces are sewed together for extracting, drying, and finishing.

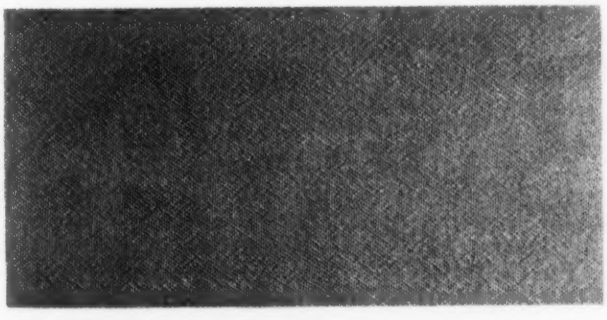
The two methods outlined require handling of the goods piece by piece, and naturally are expensive. It is preferable, therefore, to process crepes by the continuous method whenever possible. Continuous processing reduces the cost, lessens the liability of damaging the fabric, and brings better final results.



Rayon crepes shown on delivery end of modern dryer

Goods which are not too delicate and which give an even crepeing without too many operations can be taken directly to the reel dyeing machines and given all the treatments in one machine, or the pieces can be sewed together and run continuously through a number of the reel dyeing machines arranged in series. In the latter case, the first machine contains cold water to wet out the cloth and start the crepeing. The second and third machines hold a scouring solution composed of a good grade of neutral soap, an emulsifying agent, and a small amount of soda ash. The fourth reel contains warm water for rinsing the goods. Other machines hold the bleaching solutions if bleaching is necessary. Bleaching is rarely required, except for whites or white-ground prints.

If the goods are to be dyed, the pieces can be separated at this point, and the proper yardage taken for dyeing the different shades as ordered. Direct colors are used for dyeing the cheaper grades. Crepes which are desired in sunfast or tubfast shades are dyed with vat or developed colors. Developed colors are also used to a considerable extent for discharge printing.



in finishing

After dyeing, the goods are removed from the reels, the pieces are sewed together, and the whole shade or lot is hydro-extracted, dried on a crepe dryer, and framed on a silk tenter. On the tenter, the fabric is steamed and passed over gas flames. The crepe is then ready for printing or the actual finishing operations. In finishing rayon crepes, use of excessive amounts of softener must be avoided; otherwise an undesirable oily effect may be obtained.

Caustic Treatment

Of late the use of caustic soda in the preparation of rayon crepes has been adopted more or less generally. This method, although hardly out of the experimental stage, apparently has considerable merit. In the original trials 5 lb. of caustic was dissolved and added to the cold water in the first reel machine. The goods were given a 30-min. run in the weak caustic solution. This treatment produced a more even crepeing action on most of the different constructions. It is necessary to give the cloth a thorough cold water wash in order to remove as much of the caustic as possible before the cloth is passed into the hot scouring bath.

After many trials it has been found that fabrics handled by the stick method show the best results when treated in the first tank for 30 min. in a 2% solution of caustic soda at room temperature. Not many of the crepes which require the dashwheel method need the caustic treatment, but those which do can be treated with solutions of the same strength and temperature and for the same length of time.

Constructions which usually are put directly into the reel machine can be treated with a 2% solution of caustic in the first cold water; or they can first be padded with the caustic solution, piled loosely in a box for 30 min., and finally transferred to the reel machine where the caustic is washed out as completely as possible before subjecting the cloth to further treatment.

Improved Technique and Modern Equipment Account for Progress in Dyeing Rayon Yarn

By James A. Austin
New England Editor, TEXTILE WORLD

CONTINUED efforts have been made during the last year to improve the technique and equipment used in dyeing rayon, both in skein and package form. As in the past, energy has been focused largely on the development of methods which will produce level dyeings without impairing the winding qualities of the yarn. Progress in skein dyeing has been furthered by the development of equipment designed especially for processing rayon with the minimum amount of rough handling. At the same time, further attention has been given to the dyeing of rayon in wound or package form, and noteworthy advances have been effected.

Two contending factors—neither of which can be ignored—are involved in the skein dyeing of rayon. In the first place, rayon picks up dyestuff more rapidly than cotton, and precautions must be taken so that the dye will not jump on part of the skein, or part of the lot, with resulting unevenness. In the second place, rapid movement, as a means of accomplishing level dyeings, has a tendency to produce skeins which cannot be wound economically.

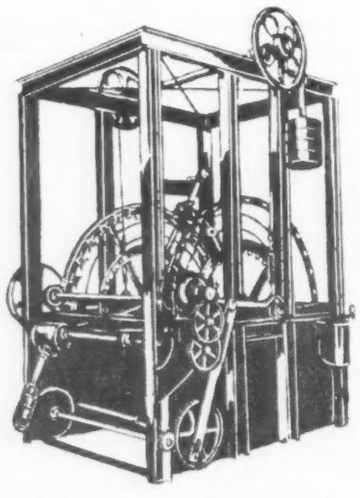
Early dyers of rayon were the first to face the problem of producing skeins which were level and which could be wound, particularly when they handled 150-denier yarn, or finer. In the beginning, when 150-denier rayon was given to cotton-yarn stick-men and whipped about in a hand tub in a similar manner to 10/2 cotton, some interesting specimens were produced. It was not unheard of, for example, to find all four of the usual rayon tie-bands within 3 in. of one another. When such skeins could be wound at all, the cost of skein-spooling often ran to the prohibitive figures of 75 and 80c. per lb., with broken filaments and knots prevalent.

As a result of the difficulties encountered, the present methods of hand-tub dyeing were evolved. The first step is a careful selection of dyestuffs, colors which dye most evenly on rayon being chosen. The yarn is wet out in hot water, lifted from the bath, and the dyestuff added. Dyeing is started at about 105° F., and the temperature is raised slowly to 140° F. With heavy shades it is best to add the dyestuff in two or more parts. The usual method is to have the skeins on two sticks, rather than on the single stick common to cotton dyeing. Use of two sticks does away with the hazard which is usually attendant to turning skeins by hand, the procedure being to lift one stick, move it to one side, catch the skeins lower down with the other stick, and then drop the first stick, thus turning the skein. All operations must be performed slowly and gently.

In dyeing with some of the direct colors, and more particularly with certain vat colors, which have a noticeable affinity for rayon, the use of some agent which will retard the speed of dyeing is favored. A colloid, such as 2% of glue, or one of the specially prepared compounds, is added to the dyebath for this purpose. It is essential to hit the correct shade quickly. This is due to the fact that if the rayon remains in the dyebath for more than 30 min., it will be difficult to wind. Usual procedure is to finish off with 2% of soap; but where difficult winding is anticipated, 2 to 3% of one of the many softeners on the market will help. Before being placed in the extractor, the skeins are wrapped in cheesecloth, about 2½ lb. being placed in each bundle. Drying is best done at a temperature of about 150° F.

Skein-Dyeing Machines

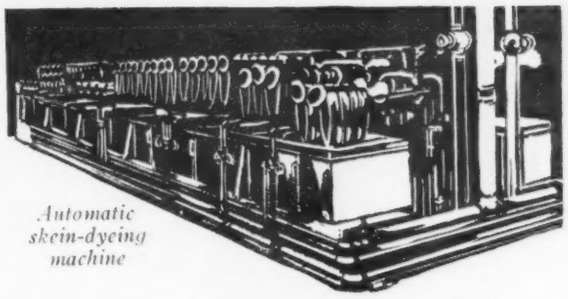
In general, machinery for dyeing rayon in skein form falls into three groups: machines consisting of a large reel which revolves in a semi-circular vat; those consisting of a series of arms which manipulate the skeins in the bath; and those designed to give a flow of liquor through the skein (rather than the skein through the liquor) combined with a slight movement of the yarn.



Spider-type skein-dyeing machine

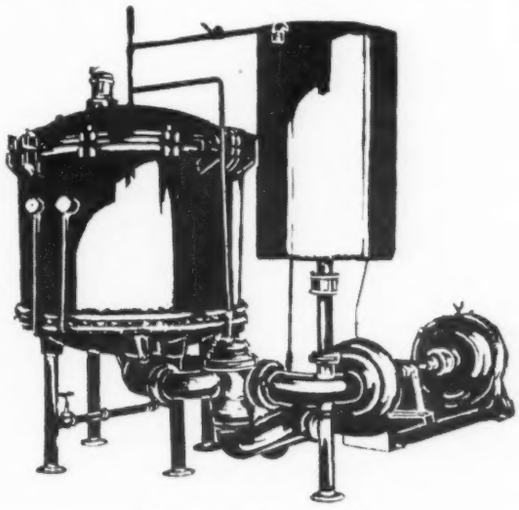
Machines of the first type are built with two large reels or spiders equipped with series of sticks at the circumference and near the hub on which the skeins are stretched. The reel is half submerged in the bath and is revolved, the skeins being also turned on the sticks. This type of machine closely follows in design those used in cotton yarn dyeing, but on the rayon machines provision is made for lifting the entire reel clear of the dyebath.

Machines of the second type consist of a long tank over which extends a series of relatively large diameter reels or rollers upon which the skeins are hung. The reels are rotated and moved up and down eccentrically, provision being made also to lift the skeins entirely from the bath. Generally, removable partitions are provided for the tank, and the reels can be handled in groups of various numbers so that either small or large lots can be dyed.



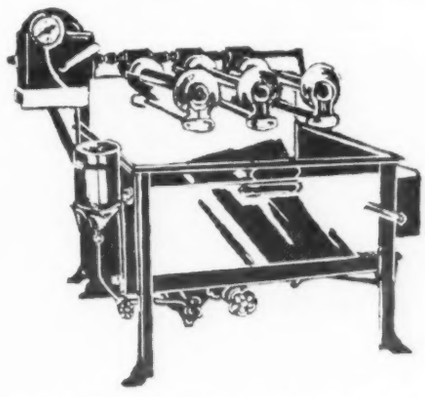
Automatic skein-dyeing machine

While this type of machine is also used extensively in cotton dyeing, it has found wide application in handling rayon, giving quick immersion and gentle handling. During the last year refinements have been made in the motion of the reels to minimize tie-band slippage and to eliminate tension on the yarn. Capacity of individual reels is as high as 10 lb. With machines of this type, considering the bath used, particular care must be observed in dyeing vat colors. Since a large portion of the skein is exposed to the air, oxidation of the vat will take place unless caution is observed. To prevent oxidation, it is necessary to employ additional hydrosulfite, the exact amount depending upon the individual dyestuff, or dyestuffs, used. With colors, such as Blue GCD, where the leuco compound is the same shade as the oxidized color, and it is difficult to tell at a glance when complete reduction is obtained, care is needed in working out amount of hydrosulfite required.



Package dyeing machine

The third, and newest type of skein dyeing machine suitable for rayon is one which employs a relatively large flow of liquor through the yarn, combined with a slight movement of the yarn. In this machine the yarn is hung on specially designed perforated tubes, 7 to 9 lb. on each tube. Directly below the yarn is a tank or container for the dyebath. The dye liquor is pumped from the tank and out through the perforated tubes. It then flows through and down the skeins and back to the tank, the entire bath being circulated in about one minute. To insure uniform action on all parts of the yarn, the skeins are moved slightly on the tubes at intervals of two minutes. This type of equipment is designed to permit a very short bath, and at the same time, to keep the skeins immersed in the liquor at all times and thus prevent premature oxidation in dyeing vat colors. The machine has been designed also to prevent impairment of the winding quality of the rayon yarn.



Circulating-liquor skein dyeing machine

All the machine methods of dyeing rayon offer considerable savings over the hand-tub method and have the additional advantage of reducing manual handling. Equipment for extracting and drying has been constantly refined to keep pace with advances in dyeing, and each year new developments all along the line make possible the handling of finer and finer sizes. At the present time most rayon skein dyers hesitate to go below 100 denier, no matter what method of dyeing is used, although 75 denier has been dyed on a commercial scale.

Dyeing rayon in the package form, which obviates winding from the skein after dyeing, has long been regarded as one way to eliminate difficulties in winding. At present the greatest retardant is cost of preparing dye package; and it will probably remain so until the rayon manufacturers are able to deliver the yarn in package form at skein prices. In package dyeing, the yarn must now be wound from skein to spool, to package, and then to delivery tube, as compared with just skein to spool, which prevails in a fair portion of skein dyeing, or skein to spool, to tube or cone. The result is additional cost of 5 to 10c. per lb., depending on denier.

Package dyeing finds application at present in two fields: first where extremely level dyeing is desired and where even the slight constriction of the tie-band would produce objectional results; second in handling lots which would be unwindable after skein dyeing. 50-denier yarn having been dyed successfully by the package method. Acetate yarn cannot be dyed in the package, as the colors are in colloidal suspension and would be filtered out.

Further development of package dyeing depends upon delivery of rayon yarn in wound form from the rayon plant. Manufacturers now desulferize when the yarn is in skeins. Although desulfurizing on cakes or bobbins is now practiced in production of knitting rayon, this operation is impractical for rayon to be package dyed owing to the fact that, during the process, the yarn has a tendency to shrink. There is, however, little opportunity for yarn on inside of the package to shrink. Therefore the outer layer shrinks normally, while the inner layer only awaits further contact with water to continue the shrinking process. As this further contact with water usually occurs after the fabric is woven, tight places and shiners in the cloth may result. The shrinking action, however, is not so detrimental in knit goods, where looseness of the yarn allows shrinkage.

Wool Fabrics

Enhanced by Introduction of Rayon Yarns

By Richard Jackson

THE last two years have witnessed the closing down of many rayon-producing plants in Great Britain and a general deflation of the rayon industry. A few years ago there was an orgy of company promotions and speculations in this fiber, and it has ended in disaster for many of the investors. The extent of these disasters is shown in the fact that two-thirds of the companies originally formed are no longer operating and that £17,000,000, or 82% of the money put into them, has been lost. At the moment of writing, out of 24 establishments for making rayon, only seven are producing, although it is only fair to say that the firms still in operation are the largest in the country.

The quality of rayon, however, continues to improve slowly but surely; and in strength, durability, handle, and appearance the material is better than ever. There are also improved methods of handling the product, so that fewer operations are necessary in its manufacture. The use of it is broadening, and rapid advances are being made in selecting, devising, and arranging the most satisfactory weaves to which it may be applied.

By reason of the improved methods of handling or making rayon, the average denier count is now much finer than was formerly the case. The popular 150-denier has been replaced by 40s to 100s, and probably the makers of acetate rayons are reaping the fullest benefit of this change. Shirtings, fine crêpes, and voiles are being manufactured in large amounts; and with regard to the former, there is yet a good field in which to operate—a field which has been held by cotton and union fabrics since men first donned garments by slipping their heads through holes, as in the ancient jerkin. The yarn for shirtings is two-plied to obtain the smoothness and the right drape or bending property usually associated with smart shirtings. For women's and children's wear, rayon dobby styles are in great demand. Small checks, patterns, and thin stripes are finding particular favor.

Larger designs woven on jacquard looms are wanted for bedspreads, dressing gowns, and cushion squares; and these are bewildering in variety, and very choice in design and color. This work is particular and exacting, and looms used for the purpose are fitted with stop motions. For soft furnishings, rayon is now being required in increasing amount.

There is, as yet, no easy method of measuring luster, but the rayon industry would welcome a formula. Years ago excessive brilliance became the badge for cheapness—the standard article, of course, being real silk. The reaction against luster has grown to such proportions that all firms now produce dull yarns, many different methods of delustering being in use.

Silk is the material par excellence for crêping. The difficulties encountered in the production of rayon crêpes are best appreciated when the physical properties of these substances, as compared with silk, are borne in mind. Rayons, in comparison with natural fibers in general, have low elastic limits, high degrees of plasticity, and are weaker under breaking load. The crêping property of some rayons can be improved by the application of a dressing, though the same effect may be obtained by insertion of a little extra twist. The difficulty attached to the application of sizing lies in the fact that rayon is weakened upon coming in contact with moisture.

Firms specializing in the production of coating fabrics have not been particularly keen to incorporate synthetic fibers into their cloths. The reason is obvious. Brightness and sheen are not features of men's wear; and since these qualities in the past have typified rayon, there has appeared to be little use for it in this particular sphere. At the moment, however, changes seem to be imminent, for experiments on an extensive scale are being conducted, and the cloths recently shown at the Imperial Wool Industries Fair favorably impressed buyers. Broadly speaking, a viscose yarn with a dull finish, twisted with white worsted, is the basis adopted. It does not require much technical knowledge to realize that this offers an infinite scope for variety.

For qualities made to sell strictly "at a price," white rayon is used in combination with piece dyeing. These fabrics are given suitable warp and filling coloring by the insertion of, for example, four solid worsted and two union twist—say, 25% rayon. The effect is distinctly pleasing, particularly when the dyeing is black, navy, or russet brown. Tinting of the viscose in the piece-dyeing process in order to obtain different effects is not altogether satisfactory, as it is an exceedingly difficult matter to obtain colors of the necessary fastness. If these really high-class novelty-twist effects are wanted, it is best to start with colored yarns for one or both components.

Rayon manufacturers who want cross-dyed effects are finding it better to use acetate as filling and viscose as warp because the former gives a more silk-like appearance and a kindlier handle.

Novelty yarns continue to attract attention; and rayon spots are playing their part, not only in coats and dresses, but in women's hats and even in men's woolen overcoatings. A new fancy yarn, known as "Friska," consists of a two-ply base yarn of cotton or rayon and two overlapping threads of rayon, added separately and twisted in opposite directions, with the last two threads in excess of the foundation. It is something between a loop and a spiral yarn.

Directory
of U. S. Producers of Rayon and Other Synthetic Fibers

IN the following directory of United States producers of rayon and other synthetic fibers, the capacity given in each case is the theoretical output if the company's plants were running full, and consequently does not necessarily represent this year's production. In this and the other items listed, every effort has been made to check the information but absolute accuracy cannot be guaranteed.

—*Editor.*

Acme Rayon Corp., Cleveland, Ohio. *Plant:* Cleveland. *Process:* Viscose. *Capacity:* 1,250,000 lb. *Officers:* C. P. Green, president and treasurer; C. A. Huttinger, vice-president; George B. Harris, secretary.

American Bemberg Corp., 180 Madison Ave., New York. *Plant:* Elizabethton, Tenn. *Process:* Cuprammonium. *Capacity:* 5,000,000 lb. *Officers:* S. R. Fuller, Jr., president; B. C. Dunlop, vice-president; H. W. Springorum, secretary-treasurer.

American Enka Corp., 271 Church St., New York. *Plant:* Enka, near Asheville, N. C. *Process:* Viscose. *Capacity:* 10,000,000 lb. *Officers:* A. J. L. Moritz, vice-president and technical manager; C. McD. Carr, commercial vice-president; J. T. Johnson, treasurer; C. VanderHooven, secretary and assistant treasurer.

American Glanzstoff Corp., 180 Madison Ave., New York. *Plant:* Elizabethton, Tenn. *Process:* Viscose. *Capacity:* 14,000,000 lb. *Officers:* S. R. Fuller, Jr., president; B. C. Dunlop, vice-president; H. W. Springorum, secretary-treasurer.

Amoskeag Mfg. Co., Manchester, N. H. *Plant:* Manchester. *Process:* Viscose. *Capacity:* 1,000,000 lb. *Officers:* F. C. Dumaine, treasurer; Henry E. Rauch, secretary. *Remarks:* Company is primarily a spinning and weaving concern; rayon production is a minor part of its activities.

Belamose Corp., Rocky Hill, Conn. *Plant:* Rocky Hill. *Process:* Viscose. *Capacity:* 2,500,000 lb. *Officers:* John C. Cosseboom, president; L. F. Dettenborn, vice-president; John C. Parsons, secretary; C. B. Healy, treasurer, K. A. McCarthy, assistant secretary; G. T. Loveridge, plant manager. *Remarks:* New York sales office, 303 Fifth Ave., also offices at Ambler, Pa., and Woonsocket, R. I.

Carolina Rayon Mills, Inc., Burlington, N. C. *Plant:* Burlington. *Process:* Viscose. *Capacity:* 1,000,000 lb. *Remarks:* Plant not operating at last report. *Officers:* A. M. Johnson, president.

Celanese Corp. of America, 180 Madison Ave., New York. *Plant:* Amcelle (near Cumberland), Md. *Process:* Cellulose Acetate. *Capacity:* 11,000,000 lb. *Officers:* Camille Dreyfus, president; W. McCameron and J. A. Larkin, vice-presidents; E. E. Boreham, vice-president and treasurer; Lee Cadien, secretary.

Delaware Rayon Co., New Castle, Del. *Plant:* New Castle. *Process:* Viscose. *Capacity:* 2,000,000 lb. *Officers:* J. Pilling Wright, president; Leon H. Ryan, treasurer and general manager.

Du Pont Rayon Co., Empire State Bldg., New York. *Plants:* Buffalo, N. Y.; Old Hickory, Tenn.; Ampthill and Waynesboro, Va. *Processes:* Viscose and cellulose acetate. *Capacity:* 30,000,000 lb. viscose and 2,000,000 lb. acetate. *Officers:* L. A. Yerkes, president; B. M. May, Maurice du Pont Lee, and C. M. Albright, vice-presidents: O. E. Adamson, treasurer.

Furness Corp., Gloucester City, N. J. *Plant:* Gloucester City. *Process:* Cuprammonium. *Capacity:* Unknown. *Remarks:* Plant not in full commercial operation at last report. *Officers:* W. H. Furness, president; S. F. Hansell, vice-president; J. Vernon Pimm, secretary-treasurer.

Hampton Co., Easthampton, Mass. *Plant:* Easthampton. *Process:* Viscose. *Capacity:* 1,000,000 lb. *Officers:* Thomas McConnell, president; R. K. McConnell, treasurer; R. B. King, secretary. *Remarks:* This company also manufactures mercerized yarns and fabrics.

Industrial Rayon Corp., Cleveland, Ohio. *Plants:* Cleveland, Ohio, and Covington, Va. *Process:* Viscose. *Capacity:* 13,000,000 lb. *Officers:* Hiram S. Rivitz, president; A. A. Murphy, vice-president in charge of sales; H. B. Kline, vice-president in charge of plant operations; George F. Brooks, vice-president in charge of service, L. A. Wolin, vice-president in charge of advertising and sales promotion; D. S. Mallory, secretary treasurer; A. L. Schoenbeck, asst. secretary and asst. treasurer; E. V. Batteurs, comptroller.

New Bedford Rayon Co., New Bedford, Mass. *Plant:* New Bedford. *Process:* Viscose. *Capacity:* 2,000,000 lb. *Officers:* J. Pilling Wright, president; Edmund H. Leland, vice-president; B. F. Proud, treasurer and general manager.

Skenandoa Rayon Corp., 2 Park Ave., New York. *Plant:* Utica, N. Y. *Process:* Viscose. *Capacity:* 3,500,000 lb. *Officers:* Beecher M. Crouse, president; Hubert D. Kernan, vice-president and treasurer; Beirne Gordon, Jr., vice-president and general manager.

Tennessee Eastman Corp., Kingsport, Tenn. *Plant:* Kingsport. *Process:* Cellulose acetate. *Capacity:* 2,500,000 lb. *Remarks:* Plant starts commercial operation in fall of 1931. Company is subsidiary of Eastman Kodak Co. Distributors of the acetate yarns are A. M. Tenney Associates, 171 Madison Ave., New York.

Tubize Chatillon Corp., 2 Park Ave., New York. *Plants:* Hopewell, Va., and Rome, Ga. *Processes:* Viscose, cellulose acetate, and nitro-cellulose. *Capacity:* 8,000,000 lb. nitro-cellulose; 4,300,000 lb. viscose, and 2,500,000 lb. cellulose acetate. *Officers:* Roland C. Taylor, chairman of board; Rufus W. Scott, chairman of executive committee; B. G. Slaughter, president; J. E. Bassill and Marco Biroli, vice-presidents; E. R. VanVliet, treasurer.

Viscose Co., 200 Madison Ave., New York. *Plants:* Marcus Hook, Lewistown, and Meadville, Pa.; Roanoke, Va.; Nitro and Parkersburg, W. Va. *Processes:* Viscose and cellulose acetate. *Capacity:* 80,000,000 lb. viscose and 5,000,000 cellulose acetate. *Officers:* S. A. Salvage, president; Chas. E. Hendrixson, secretary and treasurer.

Woonsocket Rayon Co., Pawtucket, R. I. *Plant:* Woonsocket. *Process:* Viscose. *Capacity:* 2,000,000 lb. *Officers:* R. L. Brunet, president; C. R. Steedman, secretary-treasurer; I. B. Merriman, general manager; G. R. Lockhart, asst. general manager.

The Week in Textiles

as Reflected in This Issue

General

Multi-Speed Motor

Announcement is made of the incorporation of a gear-shifting arrangement in a popular type of a.c. motor, whereby a large range of speeds may be transmitted to the driving shaft. *(page 131)*

Sees Final Readjustments

The final readjustments in general business are being made, says Dr. L. H. Haney in this week's TEXTILE WORLD Analyst, which will give foundation for recovery. However, he adds that some further recession is indicated for the near future and the depression will last at least till next spring. *(page 139)*

Cotton

Style Plus Price Appeal

Two universal appeals united in lending distinction to the Fourth Annual Trade Conference and Manikin Parade held under the auspices of the Cotton-Textile Institute. The display accented the possibilities of careful styling in low-priced apparel. *(page 128)*

Rayon and Cotton

Filament, waste, and staple rayons are being used to advantage in cotton materials. The staple fiber is successfully spun on the cotton system. *(pages 96, 99, 100, 104, 105, 114)*

Cotton Down and Up Again

Cotton made a recovery after touching new lows. The decline came at the time when other commodity and security markets were at the bottom of their recent curve and the rally paralleled the rally in the other markets. *(page 143)*

Scant Interest in Yarns

Interest in cotton yarns has been limited to narrow compass. Buyers command the situation except where spot delivery on some popular count is required. *(page 143)*

Goods Quiet But Steady

Goods have remained in the doldrums with buyers seeking to better open market quotations. Sellers have not been swayed by temporary swings of sentiment and have displayed their confidence by firmness on the price basis of last week. *(page 145)*

N.A.C.M. Program

Program for N.A.C.M. annual meeting on Oct. 7 and 8 stresses current problems of distribution and manufacturing. *(page 151)*

Wool

Rayon and Wool

Woolen and worsted mills have shown an interest in filament, staple, and waste rayon. The result is an enhancement of wool fabrics. *(pages 96, 99, 105, 113, 124)*

Yarns Are Steady

Worsted yarns still hold former levels steadily. There is no evidence of surplus and a real scarcity of some numbers of spot shipment adds strength to the market. *(page 143)*

Wool Prices Are Easier

Raw wool has displayed scattered weakness lately following a long period of quiet with buyers working for concessions. Sellers are slow in letting out desirable lots and wanted grades are still relatively strong. *(page 143)*

8% Wool Goods Cut

Spring prices for woolen and worsted goods now being quoted are 8% below last season's levels. *(page 145)*

Wool Week, Nov. 9-14

National Wool Week is scheduled to begin on Nov. 9. It will be a period of nation-wide promotion for wool products. *(page 151)*

Knitting

Rayon Hosiery

Improvements in fiber properties have facilitated the use of rayon in circular and full-fashioned hosiery. Certain important precautions are still necessary. *(pages 100, 106, 108, 109)*

Outerwear and Underwear

Cheapening has seriously injured the popularity of rayon outerwear and underwear. The synthetic fiber has made progress in the warp-knitting branch. One-bath processing is gaining in importance. *(pages 109, 110, 111, 112)*

The Hosiery Controversy

A 20% hosiery price cut by Gotham Silk Hosiery Co. which other mills are expected to emulate immediately, and a strike of several thousand workers in Northern New Jersey who oppose the new wage reduction, are the week's developments in the full-fashioned hosiery controversy arising from the agreement reached between the American Federation of Full-Fashioned Hosiery Workers and the Full-Fashioned Hosiery Manufacturers of America. *(page 136)*

Hosiery Prices Uncertain

Uncertainty as to hosiery price outlook, especially full-fashioned, has

The Textile Outlook

THE favorable reaction of general business to the British relinquishment of gold basis for the pound was the feature of the week. No immediate reflex was evident in textile circles except maintained caution but our industry cannot long remain inactive if financial circles and commodity markets show a turn for the better. The fact that much fall buying remains to be done gives high hopes for several active weeks before the end of October. The fact that retailers are taking the battle right home to the average consumer suggests expanded distribution. What retailers are doing along the lines of advertising is evidenced in the fact that a New York evening paper for Sept. 18 carried more department store advertising than ever in its history—the newspaper was 60 pages over all. Low prices are current on nearly all textiles and they are being counted upon to broaden demand not only among consumers but for many technical uses. Cotton particularly may enter fields which would be barred to it save for its present low price.

caused buyers to ease up on their fall contracts. Half-hose active but weak. *(page 145)*

Spring Underwear Cheaper

Spring underwear prices as so far announced show a sharp cut; rayons are 8 to 10% down. Buyers hold off ordering pending study of new prices. *(page 145)*

Swimsuit Openings Slow

Less than 50% of industry has shown 1932 swimsuits as yet; mills selling to retail trade are particularly backward. New models include white suits for men. *(page 145)*

Silk

Better Days for Broadsilks?

Silk weavers lean away from reckless overproduction and new policy has helped toward a healthier industry. Continued curtailment should bring them out of "the red." *(page 129)*

High Jinks Costly

Raw silk went up and down merrily this week, ending with prices 10c. below previous quotations. Decline was due mainly to weakness in Japan. Good call from weavers here. *(page 143)*

Yarn Markets Quiet

Unseasonably warm weather is blamed by throwsters and spinners for an exceptionally quiet week; prices unchanged. *(page 143)*

Fabrics Firm and Active

Curtailment of output and better demand has improved broadsilk situation; velvets, cantons and satins all move steadily at profitable prices. *(page 145)*

Rayon

Annual Rayon Number

This issue is TEXTILE WORLD's Seventh Annual Rayon Year-Book Number covering rayon and other synthetic fibers. Up to the minute developments in merchandising and manufacturing are covered in this issue.

Profitless Prosperity

"Profitless prosperity" seems to be story in brief of the year in rayon. Production has been below capacity and stocks have been reduced. Consumption and price trends in relation to other fibers show the extraordinary growth of the rayon industry. *(pages 76, 78, 90)*

Expanding Fields of Use

Expansion of fields of use has been a feature of recent promotional work in the rayon industry both here and abroad. Merchandising programs for 1932 now in formation take this movement into account. *(pages 79, 80, 82, 89)*

Rayon Manufacture

Improved methods of rayon manufacture are responsible for better fiber characteristics and reduced operating costs. Further development is expected. There is room for greater standardization. *(pages 84, 86, 88, 102)*

Staple and Waste

Increased interest has been shown during the year in rayon staple and waste — in the former particularly. Preparation of the raw materials and their use in various textiles present new problems but offer many interesting possibilities. *(pages 93, 96, 113, 114)*

Rayon in the Mill

Experience has continued to establish better methods of working with rayon. Considerable data are now available on satisfactory practices. Research has aided the development of woven designs. *(pages 96, 99, 100, 104, 105, 124)*

Directory

A directory of the 19 rayon producing companies in the United States gives company names, processes, estimated output and officers. *(page 125)*

New Spinning Machinery

Recent developments in rayon machinery include an improved type of spool spinning machine and an automatic time-cycle control applied to a new variable-speed transmission for use in rayon spinning. *(page 130)*

New Acetate Plant

The new acetate rayon plant of the Tennessee Eastman Corp., Kingsport, Tenn., opens for commercial production next month after a satisfactory period of experimental operation. *(page 137)*

Processing

Handling Acetate Fabrics

Up-to-date methods of scouring, delustering, dyeing, and finishing acetate fabrics receive attention. *(pages 116, 117, 118)*

Skein and Package Dyeing

Progress in dyeing rayon yarn has followed improvements in technique and equipment. *(page 122)*

Finishing Rayon Piece Goods

Improved appearance and handle of rayon fabrics follow development of new finishing processes and refinement of older methods. *(pages 86, 93, 120)*

Hines to Relinquish Institute Chairmanship

WALKER D. HINES, chairman of the board of directors of the Cotton-Textile Institute, stated to the executive committee of the institute last week that it was not his purpose to accept reelection as chairman at the time of the annual meeting on Oct. 21 and that he would recommend that the executive functions heretofore performed by the chairman be vested in the president—George A. Sloan.

Mr. Hines reminded the committee that this change would constitute the complete realization of a policy originated by him three years ago which involved the election of Mr. Sloan as president in 1929 and which contemplated the ultimate vesting in him of all the chief executive functions. Mr. Hines added that in the last two years Mr. Sloan had established such a complete mastery of all phases of the work of the institute that the time was ripe for this final step in carrying out the policy referred to. Mr. Hines, who is in the practice of law as a member of the firm of Hines, Rearick, Dorr, Travis & Marshall, will be an active adviser of the institute in association with Mr. Dorr of that firm who has been the institute's counsel for the last five years.

The Business Outlook

THE picture puzzle of world depression has been completely scrambled by the British abandonment of a fixed gold basis for the pound, and it will take some time to piece it together again. Security markets are apparently putting the pieces together into a prosperity picture, but parts of the jig-saw puzzle don't fit. The sweeping reversal of speculative psychology may force them into place and start the re-inflation for which this country has now captured the credit resources and which she alone can carry through. Continued deflation of purchasing power of the two greatest markets, England and the United States, and the disorganization of the monetary basis of world trade do not provide a promising background for rising security and commodity prices. International effort to deal with underlying and unresolved issues is clearly indicated as inevitable. It remains to be seen whether the wave of wage-cuts which has quickened investment confidence will be followed by widening markets, expanding credit and increased employment.—*The Business Week*.

Gay Color, Tasteful Design Feature

Low-Price Cotton Garment Show

The Cotton Textile Institute

(Left) Pajama print of cotton in red, black and white shown by Pacific Mills; (right) dotted, red and white, printed swiss for afternoon frock by Henry Glass & Co.

THE Fourth Annual Trade Conference and Manikin Parade held under the auspices of the Cotton-Textile Institute, at 40 Worth Street, New York, Sept. 17, attracted a representative cross-section of the cotton goods, dress and retail trades. It is estimated that more than 1,200 persons attended. Cooperating with the institute in the event were the National Association of Cotton Dress Manufacturers, the Associated Dress Industries of America, and the United Women's Wear League. It was the first time the latter two organizations had aided in this show and it made the event more than usually significant.

The manikin parade was arranged by Miss Susan Bates, trade counselor of the institute, who also explained style and fabric trends in a running comment as the models were shown. The display was limited to garments retailing from $1.00 to $6.95, but despite the price restriction a surprisingly varied line of apparel was shown. The garments were available for individual inspection by visitors following the parade, and many manufacturers and others utilized this privilege.

Easily the most striking group in the show was that of pajamas. There were 22 pajama models displayed and they were notably illustrative of the style possibilities of cotton goods in this field. Colors were gay and leaned to brilliant contrasts; one sailor model excited especial interest as did a dashing pajama-ensemble of red, blue and navy. In pajamas, cotton prints are perhaps at their best; the fabrics take dye so perfectly that they are particularly adaptable to the festive designs favored for beach wear.

In the sports group corduroy, was important—not indeed in numbers, only one corduroy being shown—but as indicating cotton's style possibilities. Satinette, percale, crepe and shantung were stressed in the morning wear and general daytime divisions.

Miss Bates spoke optimistically of the outlook for cottons in the low-priced dress field and pointed out that cotton frocks are no longer restricted to any particular activity of the day.

An abstract of her address follows:

"Much has been done, and we hope will continue to be be done, to call attention to the high style importance of cottons in general. However, it is also important to consider the great volume market. The scope of this trade conference is, therefore, confined to this volume end of the cotton business. It highlights the new trends in this market, the new fabrics and designs brought out especially for it, the new fashion points suitable, the new treatments of color, the new types of garments that fit in. Everything shown in the fashion parade was made to retail between the prices of $1 and $6.95.

"The last season has demonstrated more than ever, the fact that cotton has come back into its rightful place in the sun—and has come back to stay. In every price range and in every type of costume, cotton has made a decided place for itself. It is not necessary, any longer to enlarge on this theme. To call to your attention the news in the cotton world, the grand things designers and cotton manufacturers have done in the way of new textures, new colorings, new designs—makes a most exciting story.

"There is a tendency, growing by leaps and bounds, to wear cotton frocks no matter where women may be. The new weaves that have been brought out and the new colorings have much to do with this. Certainly the cotton tweeds and such are perfectly at home in the shopping districts. And when these fabrics are made in styles that are correct for general daytime wear—in tailored frocks for instance, and ensembles,—it is perfectly obvious why they are such a success. Notice again the colors—they're very important. The new use of diagonal lines, again the double-breasted effect and the tendency toward broader shoulder lines. All of these things are important in the fashion news of the day.

"In this age no wardrobe is in the least complete without a group of pajamas. Women wear them in the kitchen, in the living room, in the bedroom, on the beach—even to dance in. Not that we plan to show you any of this last type, we merely mention them to show you the all-important place pajamas hold in the fashion picture. Again I want to call to your attention the fashion high spots—the extravagent use of color—that's extremely important—the new weaves—a smooth eponge for instance, the use of corduroy, gingham combined with eponge, our old standbys—pique, broadcloth, chambray, still as great favorites as ever. Frequently they are printed—and if so they are printed in dramatic designs. Often they are solid color, but you will notice that usually two or more colors are used together."

Curtailment

Helps Broadsilk Mills on Path Toward Profit

THE broadsilk industry, long a victim of its own fondness for producing goods irrespective of demand, seems to be taking the lesson to heart. A new spirit is evident among these weavers this fall; the hectic rush to pile up stocks is absent; and already this had had a healthy affect on the market. It is too early to say that the corner has been turned; but continuation of the present curtailment policy undoubtedly will help toward a more stable market and toward prices which allow of at least a moderate margin.

Better Statistical Position

At present, broadsilks are in a better position than they have been for several years at this time. Mills suffered so acutely during 1930 that they slowed down last spring on production and the fall season opened with stocks decidedly below what they were a year before; indeed, as the accompanying table shows, the stocks were cut 20.5% against sales gain of 10%. The result to date has been so satisfactory that it should encourage the industry to continue, even to extend the curtailment.

Manufacturers of transparent velvet are enjoying something approaching a boom season. Prices were advanced early in the season; production was held down very strictly and now mills are sold many weeks ahead on their most popular velvets. Levels are steady and allow of reasonable profit. Prospects point to active reorder business and if the velvet mills do not weaken on their curtailment they should end their season well on the black side of the ledger.

Other popular broadsilks also are firm; crepe-back satins have sold actively with no sharp variation of price and cantons were a good money-maker in second position. Lately cantons took a jump to first place. The firm attitude of the mills in holding down stocks has given the market a new vitality; satin and canton prices have been noticeably lacking in their usual mid-season breaks. Cutters and retailers are just as well pleased, since the firm tone clarifies their position and they are not forever worrying about buying too high in a falling market.

Postponement of Spring Opening?

Equally promising is the desire among fabric manufacturers to continue along this line. The industry is finally awake to the hand-to-mouth buying difficulty and aims at hand-to-mouth production as a solution. One important step has just been taken by the Broadsilk Division of the Silk Association of America. This group at a meeting held last week in New York voted to send out a questionnaire to the industry on the advisability of postponing the openings of spring lines.

The point is that early spring showings bring little response from buyers; industrial conditions have brought buyers closer to their actual turnover and they are constantly narrowing the stretch of time between purchase of goods and sale, whether it be piece goods or garments. Manufacturers of broadsilks are coming more and more to favor late openings, as too early displays allow their new lines to get stale before any real demand is manifest at the buying end.

SALES INCREASE
First 7 months of 1931 against 1930
10%

STOCK DECREASE
First 7 months of 1931 against 1930
20.5%

Curtailment Practiced

Leading fabric mills plan a rigid curtailment of production for spring fabrics. The schedule of output is so altered that it practically puts the mills on a produce-to-order basis. So far this step has not been taken by the majority of manufacturers, but it is possible they may do something along this line.

Certainly, there is a new feeling manifest in the industry; the mills show real eagerness to dig themselves out of "the red." Cooperative action toward tallying stocks with sales is the only way to real profits; broadsilk weavers have taken a step toward that; it is only a first step, and they must continue in the same path if they hope to make profits. But it is a step in the right direction.

New Machinery *and* Processes

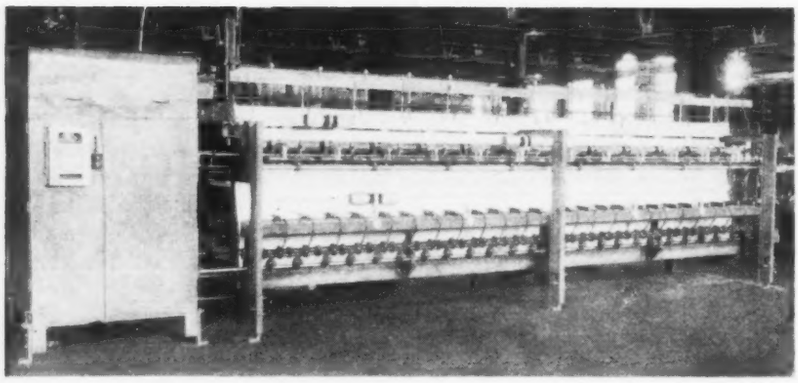


Fig. 2. Spool spinning machine of latest type equipped with automatic doffing mechanism

Spool Spinning Machine for Rayon Manufacture

IMPORTANT improvements in the design of rayon manufacturing equipment have been embodied in a longitudinal spool spinning machine announced recently by Max Ams Chemical Engineering Corp., Bridgeport, Conn. In this new machine an ingenious traverse motion which was an outstanding feature of the previous model has been retained, and an automatic doffing device has been incorporated. This permits use of 125-mm. spools and gives the undulated wind featured last year, and at the same time, reduces the amount of supervision required. In addition, other refinements have been made in this latest type of equipment to allow spinning at speeds in excess of 100 meters per min., to decrease floor-space requirements, and to insure yarn of a uniform denier throughout the spool.

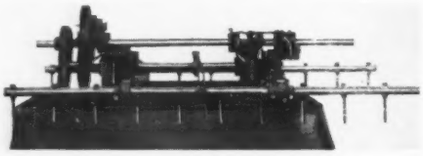


Fig. 3. Improved traverse for spinning machine

In Fig. 1 is illustrated an eighteen-section machine of the older type, and in Fig. 2 is shown the improved model. Close-up side and end views of the traverse motion common to both machines are given in Figs. 3 and 4; and in Fig. 5 the structural details of this device are shown.

Fig. 6 indicates the manner in which the rayon is laid on the spool with the unique undulated wind. One of the chief advantages of this type of wind is that it reduces the time necessary for washing the spool, as the wash liquors are able to permeate readily through the loosely wound layers of yarn. Experiments which are now being carried out indicate that by use of the undulated wind it will be feasible to employ spools of considerably greater diameter than the 125-mm. size which has already replaced the smaller ones previously necessary. Another advantage of the undulated wind is in twisting. Good ballooning is obtained; the yarn is loose on the spool; the take-off is much faster than in the past; and therefore the twisting operation can be conducted at high speed without danger of breaking the thread.

Reference to Fig. 2 will make clear other features of the latest types of machine. Mention has been made previously of the automatic doffing mechanism. With this device, when one spool is full, an empty one swings into place in such a manner that the strand of yarn is broken from the full spool and transferred to the other without manual assistance and without interrupting the spinning process. At the same time the denier and compensating control mechanism drop back for the starting of the new spools. All ends begin and doff at the same tension to insure the same denier on every spool. In this way the labor to operate the machine is reduced, since the operator has only to remove the full spool, replace it with a new one, and throw a hand lever which controls the position of the doffing mechanism and which also acts as a safety device.

Another important feature of the new spinning machine is an improved compensator which actuates the variable-speed drive, and which automatically regulates the speed of the bobbin so as to give a uniform take-up of the yarn at all times and thus produce rayon of

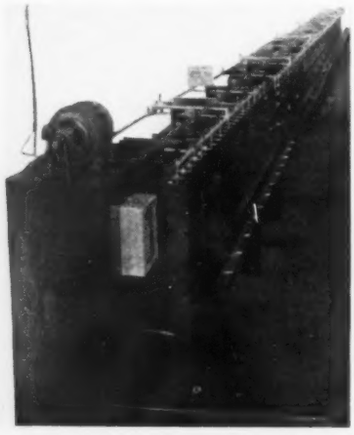


Fig. 1. Eighteen-section spool spinning machine

Fig. 6. Spool of rayon showing undulated wind

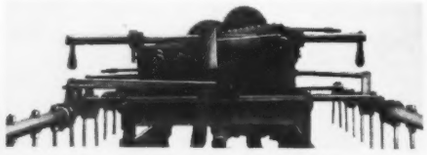


Fig. 4. End view of traverse

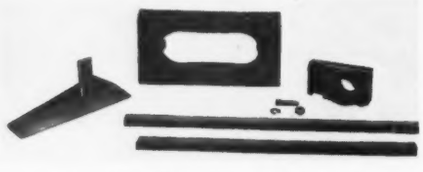


Fig. 5. Structural details of traverse

uniform denier throughout the spool. A curved-wedge compensator replaces the straight-wedge type previously employed, it having been found that the curve is necessary to adjust the spool speed in such a way as to counteract the yarn shrinkage which normally takes place in the center of the spool. The same tension is maintained on the yarn from the thread guide to the spool at all times. A recording instrument keeps permanent record of the spinning operation and thus affords a check as to the denier of the rayon.

To prevent the spool holders from jumping during doffing, a two-speed drive has been added. With this arrangement, the spool drive is automatically reduced to about half speed during the doffing operation, and then in a few seconds, is brought back to full speed.

By adopting the longitudinal spool design for the new machine it has been possible not only to conserve floor space and facilitate doffing, but also to simplify the equipment and eliminate working parts which previously were placed on the top of the machine, all mechanism now being grouped in the power head,

Device for holding thread cones

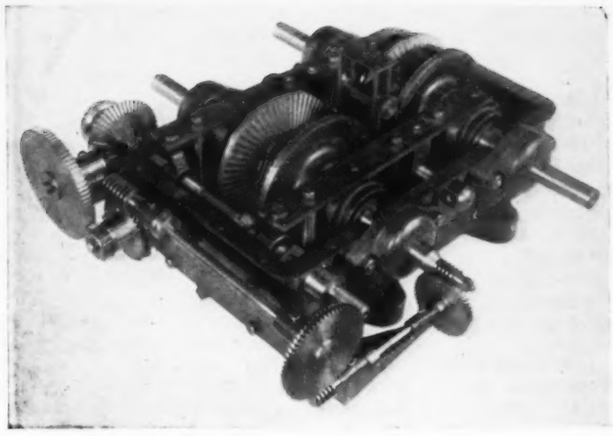
with only rotating members on the spinning frames.

In addition, danger of splashing is avoided, since the acid carried from the coagulating bath by the yarn drops directly into the tank.

Other features of the machine include ball and roller bearings throughout (with the exception of the spool bearings which are special impregnated wood bearings), all exposed gears and shafts of acid-proof construction, gear-driven spools, and improved ventilating equipment to remove corrosive fumes. The variable-speed drive, compensating mechanism, etc., are enclosed at one end of the machine.

Thread Cone Holder

THE simple device for holding thread cones shown in the accompanying illustration has been developed recently by Union Special Machine Co., 40 North Franklin St., Chicago. The holder has been designed especially to prevent thread from falling and breaking.



P. I. V. variable-speed transmission equipped with automatic time-cycle control for rayon spinning

Rayon Time-Cycle Control on P.I.V. Transmission

THE application of an automatic time-cycle control to the P.I.V. (positive infinitely variable) mechanical transmission described in TEXTILE WORLD, Nov. 29, 1930, has been announced by Link-Belt Co., Philadelphia. This control was developed especially for rayon spinning and is designed to reduce accurately the speed of the driven shaft in accordance with any desired speed curve. The rate of change can be altered as required as regards both the time cycles and the percentage of rate of decrease. Undoubtedly the new control will find application in other fields.

Lubrication of Raw Stock with Diethylene Glycol

ATTENTION is called to a number of typographical errors which occurred in the formulas recommended in Mr. Harvey's article on "Lubrication of Raw Stock With Diethylene Glycol" which appeared in our issue for Sept. 12.

As published, the formulas read as follows: "In the case of woolens, for each 100 lb. of stock use 10.0 lb. diethylene glycol, 8 oz. sodium carbonate, 4.8 oz. sulfonated olive oil, and 3.3 lb. water. In the case of worsteds, for each 100 lb. of stock use 4 lb. diethylene glycol, 32 oz. sodium carbonate, 2 oz. sulfonated olive oil, and 2.5 oz. water."

These should be corrected to read as follows: "In the case of woolens, for each 100 lb. of stock use 10 lb. diethylene glycol, 0.8 oz. sodium carbonate, 4.8 oz. sulfonated olive oil, and 0.33 lb. water. In the case of worsteds, for each 100 lb. of stock use 4 lb. diethylene glycol, 0.32 oz. sodium carbonate, 2 oz. sulfonated olive oil, and 2.5 oz. water."

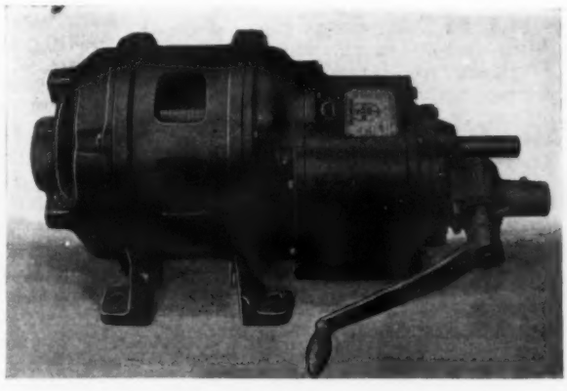
Multi-Speed Drive

A MUTI-SPEED reduction gear unit built in combination with a standard a.c. motor has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Constructed to give four different speeds to the output shaft at constant horsepower, this unit, known as the Westinghouse-Wise Multi-Speed Drive, is applicable to those industrial operations which, for highly efficient performance, require drives providing more than one speed. The company states that with this drive the speed of the driven apparatus may be changed instantly while the motor is running at full speed and under full load.

All gears are constantly in mesh, and the operator cannot injure the unit by changing speeds at any time.

This gear unit is mounted on a standard squirrel-cage Westinghouse induction motor.

The gear shifting is accomplished by means of a hand lever which automatically operates a clutch and allows the gears to be meshed easily. The gear unit is mounted on a standard squirrel-cage induction motor offered in three units ranging from ½ to 7½ hp. The four speeds available in the gear drive itself, plus the availability of a variety of motors giving different driving speeds, makes it possible to choose a combination that covers a wide range of speeds.



Device makes possible transmission of a wide range of speeds

NEWS about MEN

William S. Pepperell, president of the Southern New England Textile Club, Providence, R. I., presided at the 148th dinner of the organization last Saturday, which was the first of the season. The meeting took the form of a clambake which was held at the Pomham Club, Riverside, Narragansett Bay. Mr. Pepperell is president and treasurer of the Hebron Warehouse & Processing Co., Hebronville, Mass.

Ferdinand Thun, who sailed for Europe Aug. 1, with Mrs. Thun and Mrs. Max Mittendorf, had a pleasant chat with President Von Hindenburg of Germany. They discussed industrial and business conditions and the President asked many questions about the United States. The party also visited Barmen, one of the largest cotton manufacturing centers in Europe, and Mr. Thun's birthplace, but have spent most of their time at Kissingen, a famous health resort. They expect to start for home the middle of October.

Stuart W. Cramer, president of Cramerton (N. C.) Mills, Inc., and active in many business organizations and in welfare work, must share his distinction with **Mrs. Cramer,** who, on the Norwood course at Blowing Rock, N. C., drove to the 10th green with a brassie and the ball rolled on into the cup. She is the first women to make a hole-in-one on that course.

S. Robert Glassford, president of Bliss, Fabyan & Co., Inc., New York, sailed for Italy on the "Augustus" Sept. 18, for an extensive business trip which will take him to the more important textile and style centers in Europe. From Genoa, Mr. Glassford plans to go to Milan, where he will visit leading textile manufacturing concerns. From Italy he will go to France, visiting Paris and other style centers, and then to England to conclude his study of business conditions and fabric trends abroad. Mr. Glassford, who is accompanied by his wife, expects to return about Nov. 15.

August Hafner, former president of Altoona (Pa.) Textile Co., and former vice-president in charge of production for Amalgamated Silk Corp., New York, has become connected with H. R. Mallinson & Co., Inc., New York, as general superintendent of mill production.

F. J. du Toit, secretary of the South Africa wool council, was a visitor in Portland, Ore., the week of Sept. 14, to discuss matters pertaining to the wool industry. The Chamber of Commerce appointed a hospitality committee to entertain Mr. du Toit, which included Clarence Bishop, Roy Bishop, Roy Ward, Eric Grant, Harry O. Mitchell, C. E. Grelle and A. C. Gage.

J. J. Ponders has tendered his resignation as general superintendent of the spinning, winding and twisting departments of the Cherry Cotton Mills, Florence, Ala. He has been succeeded by **A. H. Goodman,** who went there from Clinton, S. C.

Joel M. Barnes, of Barnes Textile Service, consulting engineers, Boston, Mass., and Mrs. Barnes, sailed on the "Bremen" Sept. 23 for a European trip. Mr. Barnes will visit Poland to investigate textile mills there for a group of American bankers.

S. Robert Glassford, who has started a tour of European fabric and style centers to study fabric trends and business conditions

W. T. Joyce, formerly president of the Slater Co., Inc., Webster, Mass., will become associated with the American Printing Co., Fall River, Mass., on Oct. 1, according to current report. Mr. Joyce was at one time president of the U. S. Finishing Co., New York.

M. H. Epstein, president of Advance Piece Dye Works, Rutherford, N. J., has returned from a five weeks' business trip to Europe. He visited many of the foreign textile mills and finishing plants seeking new ideas to apply to his business. While in Bremen Mr. Epstein made a sightseeing tour of the city with James J. Walker, Mayor of New York.

Frank W. Harding, Jr., has resigned as a director of the Reinhardt Mfg. Co., New York, and Paterson, N. J., after 18 years' affiliation. He plans to continue his association with the ribbon industry and has inspected a number of idle mills in New Jersey and Pennsylvania and may, possibly, start a new ribbon company.

Ross G. Walker, a professor of accounting and business policy at Harvard Business School, has been appointed assistant to **Richard Lennihan,** treasurer of the Hamilton Woolen Co., Southbridge, Mass.

A. A. Moore, former superintendent, Lillian Knitting Mills Co., Albemarle, N. C., recently resigned to devote his time to an invention. He will be succeeded by **W. Murray Field,** Anniston, Ala.

Carlton Francis, Jr., returned last week with the H. S. Dickey expedition which has had some very interesting experiences tracing the source of the Orinoco River in Venezuela. Mr. Francis was connected with the Cotton Products Co., and later in the rayon sales department of the Cannon Mills Co., New York, when that company handled the sales for American Enka Corp., Enka, N. C.

Arthur C. Harper is the new director of the Wyomissing Trade School, Reading, Pa. For the last 10 years he has been course supervisor and head of the mechanical engineering department at Pratt Institute, Brooklyn, N. Y. Besides his experience in teaching and supervising, he served his apprenticeship as a machinist and designer. Wyomissing Trade School is maintained by three prominent Reading concerns, Berkshire Knitting Mills, Narrow Fabric Co., Inc., and Textile Machine Works.

Francis P. McGee, of Lowell, Mass., has taken a position as assistant chemist with the Bates Mfg. Co., Lewiston, Me. Mr. McGee is a graduate of the Lowell Textile Institute.

A. S. Wolford, who has for the last year been connected with A. H. Garside, as assistant economist of the New York Cotton Exchange, has become associated with Marshall Geer & Co., New York, cotton futures brokers and members of the New York, New Orleans, and Liverpool cotton exchanges.

B. J. Press has been placed in charge of sales for the Kent Mfg. Co., Clifton Heights, Pa., and Hampton Looms of Va., formerly the Bedford Johnson Co., Inc., Bedford, Va. The New York sales offices are at 51 Madison Ave. Mr. Press succeeds the late Edward A. Jones.

William S. Terrell, Atlanta, Ga., representative of the Terrell Machine Co., Charlotte, N. C., and Miss Frances Esterlin, Americus, Ga., were married Sept. 15.

George J. Reis, for the last 12 years connected with the Avalon Knitwear Co., Utica, N. Y., and the Pearl Waist Co., Inc., Cohoes, N. Y., has joined the sales organization of the Blood Knitting Co., Amsterdam, N. Y. Mr. Reis will be located at Blood's New York office.

S. M. Sloan, former secretary and treasurer of Waldensian Weavers, Valdese, N. C., has returned to his old position as bookkeeper for Alpine Cotton Mills, Morgantown, N. C., succeeding **R. R. Yount,** who has resigned.

J. A. Moore, formerly president of the Patterson Mills Co., Roanoke Rapids, N. C., is now general manager of the Edenton (N. C.) Cotton Mills.

G. R. Grumby, superintendent of the cotton mills of the Cedartown (Ga.) Cotton & Export Co., has been named general manager of the company.

Harold Rose, formerly assistant manager, has been appointed manager of the Dodgeville (R. I.) Finishing Co., succeeding **Bert Forlouis.**

Morgan P. Bodie, who resigned recently as cotton buyer for the Henrietta Mills, Caroleen, N. C., has opened a general cotton merchandising business at Forest City, N. C. **J. L. Scruggs,** of Charlotte, N. C., will be associated with him.

J. Arnold Oehler has resigned his connection with the comptrollers office of the American Woolen Co., New York.

Dr. Paul Massini has been appointed chief chemist of Cheney Bros., South Manchester, Conn., silk manufacturers, to succeed **Dr. E. M. Sheldon,** who has entered the medical research field.

A. E. McKenna, professor of Weaving and Designing of the Clemson Textile Department, Clemson College, S. C., and Miss Ruth Lucille Wills of Greenville, S. C., were married Sept. 5. They will make their home at Clemson College, S. C.

F. W. Stevens, for many years with William Whitman Co., Inc., selling agents for Arlington Mills, Lawrence, Mass., has resigned. Mr. Stevens' plans for the future are indefinite.

John J. Dahne, stylist for the men's neckwear department of Cheney Bros., South Manchester, Conn., has resigned his position, to take effect immediately.

A. H. Goodman, formerly of Clinton, S. C., has gone to Florence, Ala., where he has accepted a position as general overseer of spinning, twisting and winding at the Cherry Cotton Mills.

L. A. McAlister, formerly with Dunean Mills, Greenville, S. C., has accepted a position as night overseer of weaving at the Spencer Corp., Spindale, N. C., succeeding **D. C. Yarboro** who recently resigned.

Obituary

Jesse Thilyer Lyman

Jesse Thilyer Lyman, a founder and the first and only president of the Fitchburg (Mass.) Yarn Co., died at his summer home in Ashby, Mass., on Sept. 14, after a long illness. He had been spending his winters in Santa Barbara, Calif., and his summers in Ashby for several years. Mr. Lyman was 69 years old and a native of Alburgh, Vt. He retired as president of the American Glue Co., two years ago because of ill health. He was a director of several banks and a member of various clubs. He is survived by a widow and a daughter.

John Kelly Dixon

John Kelly Dixon, aged 74, for more than 30 years one of Gastonia's leading textile manufacturers' and closely identified with the city's civic and religious life, died at his home Sept. 19, following a protracted illness. Mr. Dixon went to Gastonia in 1900, purchasing the interest of G. W. Ragan in the Trenton Cotton Mills. He then assumed the duties of active president of that concern and continued in that relationship until his death. He was also president of the Dixon Mills, Inc., Gastonia. Mr. Dixon served as Gastonia's mayor twice and was a member of the Y. M. C. A. board of trustees for 30 years. He is survived by his widow and two sons, one, A. M. Dixon, vice-president and assistant treasurer of American Yarn & Processing Co., Mt. Holly, N. C., the other, Kay Dixon, treasurer of Trenton Cotton Mills, and secretary and assistant treasurer of Dixon Mills, Inc. Interment was at Oakwood cemetery, Gastonia.

Albert D. Quinn

Albert D. Quinn, sales manager of the industrial division of L. H. Gilmer Co., Philadelphia, died Sept. 17, of heart disease in Chicago, where he had gone on a business trip. Mr. Quinn was 44 years of age. He had been connected with L. H. Gilmer Co. for 12 years, and was active in the development of the Gilmer V-Belt.

William Forrest Kincaid

William Forrest Kincaid, pioneer cotton mill superintendent, died at his home in Gastonia, N. C., Sept. 14, following a serious illness of about five months. He was 64 years of age. Mr. Kincaid first went to Gastonia from his home near that city in 1894 and became connected with the Trenton Cotton Mills, Gastonia. Later he served as superintendent of Ozark Mills, Gastonia, for about six years, and following that connecton he held a similar position with the Armstrong-Winget chain of mills. His last mill connection was with the Ozark Mills of which he was superintendent until ill health forced his retirement. Mr. Kincaid is survived by his widow and five sons.

Charles J. S. Fraser

Charles J. S. Fraser, managing director in America for Wm. Hollins & Co., Inc., of Nottingham, England, died suddenly on Sept. 20. He had been in apparent good health. Mr. Fraser came to the United States from Scotland where he had spent five years in the Glasgow office of Wm. Anderson Textile Mfg. Co., Ltd. He served in the capacity of sales manager from 1901 until 1916, when he joined the British War Mission. In 1919, Wm. Hollins & Co., Ltd., opened American offices and Mr. Fraser became managing director, in which position he served until the time of his death. Two of the company's British directors are now in America and will arrange that service to clients will continue without interruption.

Richard Otis Cheney

Richard Otis Cheney, Sr., 58 years old of Cheney Brothers, South Manchester, Conn., died Sunday in the Hartford Hospital after a protracted illness. The funeral was held in South Manchester Tuesday. Mr. Cheney was associated with William Cheney in the company's raw silk division, in South Manchester. He is survived by his widow and two sons.

Dr. Harry Phillips Davis

Dr. Harry Phillips Davis, vice-president and director of the Westinghouse Electric & Mfg. Co., died at his home in Pittsburgh, Pa., on Sept. 10. Nearly 80 patents had been issued to him for his developments in electrical apparatus.

Textile Calendar

Southern Textile Association, Eastern Carolina Division, Fall Meeting, Roanoke Rapids, N. C., Oct. 2, 1931.

Textile Division, American Society of Mechanical Engineers, and Providence Section of the Society, Joint Meeting, Providence, R. I., Oct. 6, 1931.

National Association of Cotton Manufacturers, Annual Meeting, Providence-Biltmore Hotel, Providence, R. I., Oct. 7 and 8, 1931.

Southern Textile Association, Semi-Annual Meeting, Hotel Charlotte, Charlotte, N. C., Oct. 9 and 10, 1931.

Committee D-13, A.S.T.M., Fall Meeting, Washington, D. C., Oct. 15 and 16, 1931.

Southern Textile Association, Master Mechanics Section, Fall Meeting. Gastonia, N. C., Oct. 16, 1931.

Southern Textile Association, Weavers' Section, Fall Meeting, Greenville, S. C., Nov. 13, 1931.

Silk Industry Week, Paterson, N. J., Nov. 14 to 21, 1931, including Silk Machinery Exposition, Nov. 14 to 21; National Silk Convention, Nov. 18 and 19; Paterson Silk Institute, Nov. 14.

Southern Textile Association, Spinners' Section (South Carolina), Fall Meeting, Nov. 20, 1931. (Place to be announced later.)

Cotton Manufacturers Association of North Carolina, Fall Meeting, Carolina Hotel, Pinehurst, N. C., Nov. 20 and 21, 1931.

American Association of Textile Chemists and Colorists, Annual Meeting, Boston, Mass., Dec. 4 and 5, 1931.

Knitting Arts Exhibition, 28th Annual Show, Commercial Museum, Philadelphia, April 11 to 15, 1932.

Southern Textile Exposition, Textile Hall, Greenville, S. C., Oct. 17 to 22, 1932.

NEWS about MILLS

Cotton

Cedartown (Ga.) Cotton & Export Co. These mills, idle for several months, have resumed work and 250 employees been hired. A reorganization of the company was completed several weeks ago. A board of directors was placed in charge of operations and Charles Brumby made general manager. About 60% of the machinery is in operation.

York Mfg. Co., Saco, Me., is busy. Walter H. Paige, treasurer and general manager, has said that the outlook for company is favorable, owing to the fact that it has new equipment and has improved the old. The mill now employs 700 workers and operates 1,500 looms on lawns, broadcloths, sateens, voiles, oxford and fancy shirtings, all made from combed yarns. This is the largest number of looms operated in the plant for any length of time for several years.

***Lancaster Mills, Clinton, Mass.** All claims against this company, now in liquidation, with a single $1,000 exception, have been paid. Liquidation agents have on hand about $66,000 in cash and most of this will soon be distributed among the holders of the 16,810 preferred shares.

American Printing Co., Fall River, Mass. The sale of No. 6 and No. 7 mills of the cotton goods division has been confirmed. The buyer is a syndicate headed by Phillip Rosenberg of the Arenjay Hat Co., New York. The machinery of the two mills was moved to Borden Mills, Inc., Kingsport, Tenn.

Pepperell Mfg. Co. contemplates the installation of an experimental silk weaving establishment in its No. 2 mill, at Fall River, Mass. The purpose of the experiment is to get accurate figures for the consideration of Pepperell executives. Commercial weaving will not be done at first.

Boston Mfg. Co., Waltham, Mass. Lafayette R. Chamberlin and George W. Summersby as receivers are selling 36 Saco Lowell spinning frames and 150 narrow C. & K. looms for a total price of $17,000, to A. F. Fyans, of Fall River. Mr. Fyans is to pay $10,000 in cash for the spinning frames before they are removed from the plant in Waltham and is to pay $7,000 in cash for the looms before they are removed from the plant. The receivers are also authorized to pay a commission of 10% to H. M. McCord for effecting the sale.

Amoskeag Mfg. Co., Manchester, N. H. Employees have reversed their original vote on the management's proposal to readjust the wage scale, and have accepted a reduction of approximately 10%, which affects everyone working for the company regardless of station. The new wages will be effective from Oct. 1 for a period of six months. If, at any time, there is indication of a return to normalcy, the workers' convention will discuss with the management the return of this present reduction. It is understood that the company is ready to share profits in the form of a bonus when the financial condition warrants it, as it has done in the past. Employees now working number approximately 7,000.

William H. Lorimer's Sons Co., Lawrence and Ontario Sts., Philadelphia, mercerized yarn plant, will be sold at auction by Samuel T. Freeman & Co., auctioneers, at the premises on Sept. 29 at 10 a.m. The sale is by order of the court, on petition of the receivers, Joseph H. Brierly and Arthur J. Fleming. Assets to be sold include: 6,000 lb. of mercerized and natural cotton yarns, and rayons; chemicals and dyestuffs, 15 power skein warp mercerizing machines, 35 cedar dye tanks, 5,000 dye sticks, 3 Foster 100-spindle cone winders, 3 Lowell 160-spindle ring twisters, and 15 spooling frames, spools, cones, etc.

Holmes Thread Mills Corp., Providence, R. I., recently organized with capital of 500 shares of stock, no par value, to operate a local mill, will be represented by Joseph Goodman, 10 George St., Pawtucket, R. I., one of the principal incorporators. Other incorporators are M. E. O'Connor, and William J. Carlos, both of Providence.

Lorraine Mfg. Co., Westerly, R. I., which has been shut down for some time, is now running on a capacity schedule.

***Pacific Mills,** Lyman, S. C. Ground has been broken for the new addition which is scheduled to be finished by Jan. 1.

Cutter Mfg. Co., Rock Hill, S. C., has added 250 operatives to the payroll by starting a full day schedule after many months of spasmodic operation. This schedule will continue indefinitely.

Wool

Central Worsted Mills, Inc., Central Village, Conn., have been organized to weave rayon, linen and worsted fabrics. The company will employ about 50 workers.

Dumbarton Woolen Mills, Dexter, Me., have announced a 10% wage cut effective immediately. Harold Mountain, owner and general manager, felt that the wage reduction might make it possible for him to secure more business for Dumbarton.

Wyandotte Worsted Co., Waterville, Me., has announced that its working force will be cut from 500 to 350, effective immediately, but officials expressed the belief that the company will continue operating indefinitely.

***Ohio Carpet Co.,** West Warren, Mass., resumed operations Sept. 21, after being closed for several weeks as a result of labor trouble brought on by the announcement of a 25% cut in wages. About 150 employees returned with a 15% reduction in pay.

Tatnuck Woolen Mills, Inc., Worcester, Mass., have been incorporated with a capital stock of $37,500 to succeed the **Tatnuck Mills,** operated by Fred R. Smith since the death of his father, Frank C. Smith. Mr. Smith is president and treasurer of the corporation.

Clinton (Mich.) Woolen Mfg. Co., has closed its mills for an indefinite period. The plant has been running on a curtailed basis for a number of months.

Midwest Woolen Co., Detroit, Mich., has been organized with a capital of $50,000 to operate a mill in that vicinity. Headquarters will be established at 3315 Barlum Tower Bldg. Benjamin and Samuel Jacobs are the principal incorporators.

Hardwick Woolen Mills, Cleveland, Tenn. Construction of a two-story warehouse and carbonizing building, 60 x180 ft. of brick, concrete and steel, is being done by the mill forces, according to H. B. Moore, vice-president and general manager.

Stillwater Worsted Mills, Goshen, Va., have awarded to the Harrisonburg Building & Supply Co., a contract for the erection of a large addition to their dyeing plant. The contract calls for completion in sixty days.

George H. Hirst & Co. (Canada), Ltd., Carlton Place, Ont., manufacturers of woolen overcoatings, suitings, etc., are planning an extension to their plant at a future date. The company is owned and controlled by George H. Hirst & Co., Ltd., Batley, England. The Canadian plant is equipped with 50 looms.

Georgetown (Ont.) Woolen Mills, Canada. John J. Heinbecker, former superintendent of the Dunnville (Ont.) Woolen Mills, Ltd., Canada, has leased the **Corke Woolen Mills** at Georgetown, Ont., with an option to buy. These are being reopened as the Georgetown Woolen Mills.

***St. George Woolen Mills, Ltd.,** St. George de Beauce, Que., Canada. The company has reopened a former mill for the manufacture of overcoatings and suitings and 100 men will be taken on. Two members of Henry Hamer & Sons, Ltd., England, joined the board of directors of the company.

**Indicates previous mention of project.*

Knit

Rochester (Mich.) Textile Mills, Inc., are closing one of their plant units until business improves. Production will be continued in one of the other mills of the company.

Sulloway Mills, Franklin, N. H., have purchased the **Hingham Knitting Co.,** Lowell, Mass., and will operate the plant for the manufacture of hosiery.

Gotham Silk Hosiery Co., Dover, N. J., has announced that its local mill, and the branch mill at Wharton, near Dover, will be closed for an indefinite period, upon a definite refusal of the operatives to accept a wage reduction. The wage cut approximates 35%. The two plants have been giving work to about 1,000 persons.

Ladies' Hosiery, Inc., Paterson, N. J. The machinery in the mill of this company on Marshall St., was damaged by vandals last week, with loss estimated at $15,000. Immediate replacement will be made.

Pal Knitting Mills are being organized with headquarters at 410 Pavilion Ave., Riverside, N. J. The product will be boys' cotton and worsted jacquard sweaters, with a capacity of about 300 dozen a week. A. Crowe, is interested in the project and is general manager.

Interstate Hosiery Mills, Inc., New York, have awarded a contract for another 3 story building at the Lansdale, Pa., plant. The first unit there, was erected in 1929. The second will afford an increase of 40,000 sq.ft. in floor space. W. F. Lotz, Philadelphia contractor, was given the award.

Thomas Mills, Inc., High Point, N. C., have obtained a permit to erect an addition to their building on Mallory St. which will be used as a warehouse. The estimated cost is $4,000.

***Tulip Hosiery Co.,** Frankford, Philadelphia. Because of the illness of Judge Oliver B. Dickinson, the jury trial to determine the solvency or insolvency of the company has been postponed indefinitely. Meanwhile, the affairs of the company remain under the control of John P. Reynolds and Albert A. Drucker, who were appointed receivers.

Penn Hosiery Mills, 706 Mulberry St., Reading, Pa., have applied for incorporation and will be known as **Penn Hosiery Mills, Inc.** Application was made by Benjamin W. Loeb, Emanuel W. Loeb, and Charles S. Endy.

***Davenport Hosiery Mills,** Chattanooga, Tenn. Contracts for machinery, fire protection equipment, heating and boiler equipment, for the addition, 100x225 ft., and boiler room, 30x50 ft., now under construction will be awarded about Oct. 1. Robert & Co., Inc., Atlanta, are engineers for the project. Capitol Construction Co., Atlanta, is general contractor. Contracts for brick and steel have already been let.

Standard Knitting Mills, Knoxville, Tenn. Additional cutting and finishing machinery is to be placed in a one-story addition, at Washington Ave. and Mitchell St., which will be completed in two months. A building permit gives the cost of the addition as $10,000.

High Rock Knitting Co., Bristol, Va., is advancing production at its mill and has increased the working force by more than 75 persons since the first part of September. The plant has been on a curtailed schedule for the last 18 months.

**Indicates previous mention of project.*

Silk

***J. B. Martin Co.,** Norwich, Conn., has started a night shift at its local mill, to be continued for an indefinite period, in conjunction with regular day-time schedule.

Worcester (Mass.) Silk Mills Corp. has been reorganized with **Ford, Bacon & Davis, Inc.,** New York, as managers. The company will operate on a new basis, adding about 100 employees.

Candor Silk Co., 18 Ramapo Ave., Paterson, N. J., has been incorporated with a capitol of $50,000, shares of $500 par value each. It will engage in broad-silk manufacturing and silk jobbing. Its representative is Jacob G. Goldfarb of Paterson and the principal incorporators are Benj. S. Goldstein, Henry Nirenberg, and Helen Kelly, all of Paterson.

Donald Silk Co., recently organized at Paterson, N. J., has bought out the entire plant of the **Madison Silk Co.,** Paterson. The equipment, which includes 132 looms, will be moved to Fall River, Mass.

Hercules Silk Throwing Co., Paterson, N. J., recently organized with capital of $100,000, to operate a local mill, will be represented by Abram I. Bluestein, 126 Market St., Paterson, attorney. Edwin M. Kassel and Isaac Benjamin are the principal incorporators.

M. K. Silk Co., formerly at 95 Montgomery St., Paterson, N. J., has moved its entire plant to Cedar and Straight Sts., Paterson.

Mardell Silk Co., Paterson, N. J., recently chartered with a capital of 1,000 shares of stock, to operate a local broad-silk mill, will be represented by Paul Rittenberg, 132 Market St., Paterson, an attorney. Louis Kessler and Goodman Singer, of Paterson, are the principal incorporators.

Public Silk Mills, Inc., Paterson, N. J., have been organized with a capital of $25,000, and are represented by Samuel Rosenfeld, of Paterson. The principal incorporators are Benedict Krulewitz, Passaic, N. J., Morris Schlamowitz, Singac, N. J., and Joseph Fine, Paterson.

Ram Silk Co., 5 Colt St., Paterson, N. J., has been incorporated with a capital of $100,000 with par value of $100 each share. The principal incorporators are James Jordan, Margaret Jordan and Daniel Arbreit, all of Paterson. The company is represented by Louis V. Hinchcliffe also of Paterson.

General Fabrics Corp., Central Falls, R. I., is establishing a night shift because no more workers can be accommodated on the early day shift. This activity will provide employment for at least 150 additional workers.

Juergens Silk Throwing Corp., Milwaukee, Wis., has been incorporated for $200,000 for the purpose of winding silk on a patented aluminum cone, which will, it is claimed, facilitate the throwing of silk for use in the manufacture of silk hosiery. Arthur Juergens, inventor of the new device, has been a full-fashioned hosiery knitter for 22 years, and has been connected with the Phoenix Hosiery Co., Milwaukee, for the last 12 years. Harold E. Steele, one of the national vice-presidents of the American Federation of Full-Fashioned Hosiery Workers, for seven years, resigned in order to take an active part in the new company. Harry Frank, who has been in charge of the throwing department of the Phoenix Hosiery Co. for the last 11 years, has been made superintendent. The company expects to employ about 30 girls when operations begin.

Finishing

Danvers Bleachery & Dye Works, Peabody, Mass., have adopted a full-time production schedule with full working quota of about 750 persons, and will continue on that basis for an indefinite period.

Keystone Piece Dye Works, Paterson, N. J., has been placed in the hands of a receiver, Charles Bloom, who will serve under a bond of $50,000 without compensation. It is reported that this move is being made solely for the purpose of liquidating the assets, which total more than $300,000. The corporation is represented by Harry Lawrence. Present plans would result in the selling or rental of the plant to a group of dyers, who would continue the business.

Miscellaneous

Gilet Carbonizing Co., Lowell, Mass., which scours and carbonizes wool and wool noils, has taken over the 4-story mill formerly occupied by the Hingham Knitting Co. The new acquisition, which gives the Gilet company a total of 100,000 sq.ft. floor space, will house the garnetting department.

***Rose-Derry Corp.,** Derry, N. H., is remodeling the former plant of the **United States Worsted Corp.,** Nonantum section, Newton, Mass., recently acquired. It will install equipment for complete straight-line production, raw materials entering at one end of plant with finished mattresses going out the other end. The new mill will give employment to about 150 persons.

Leo Silverman & Co., Inc., have taken over the business of **S. Rosenau & Co., Inc.,** Noble & Darien Sts., Philadelphia, manufacturers of millinery trimmings, braids, etc. The officers are Leo Silverman, president, Moe Silverman, vice-president, Lewis Silverman, treasurer, Byron K. Kaufmann, secretary.

▸ Strike and Price Cut Follow Hosiery Agreement

Announcement of a 20% cut in hosiery prices by Gotham Silk Hosiery Co., which it was expected other mills would duplicate immediately, and a strike of workers which has affected the entire Northern New Jersey hosiery district, were the week's chief developments in the full-fashioned hosiery wage-and-price controversy. The situation is the outcome of an agreement between the American Federation of Full-Fashioned Hosiery Workers and the Full-Fashioned Hosiery Manufacturers of America, providing for a wage cut of 30 to 45%. Locals of the union in New Jersey, Long Island and other areas have registered minority opposition to the cut. It is estimated that 1800 workers are on strike in the mills of the Gotham company, Van Raalte Co., Propper-McCallum Hosiery Co., Merit Hosiery Co., and other companies.

Representatives of the hosiery union were sent to the various strike centers to explain the situation to the workers and these officials were hopeful of persuading the operatives to return to work. It was stated that 600 girls employed in one Gotham mill who had walked out, decided to return and to accept the 30% cut after hearing explanations made by a union organizer.

The new agreement calls for cuts of 30 to 45%; there is much uncertainty as to whether cuts have actually been put into effect. Numerous manufacturers say they have not yet taken this step. The agreement was submitted to the union locals and the Philadelphia local approved it; in districts outside that city the locals were sharply divided.

Jack Card Is Just a Bit Caustic About Women's Rights

Editor, TEXTILE WORLD:

If I ever had gotten excited—which I didn't—over the various complaints lodged by the National Woman's Party against the move to eliminate night employment of women and minors in cotton mills, my ardor would be cooled by the news that a similar complaint has been advanced by the same organization against the decision not to employ women as "decoys" in prohibition enforcement.

I'm all for women's progress, but somehow or other I can't feel that steps to prevent either their unnecessary employment at night or their exploitation in liquor raids will seriously hamper that progress.

Can it be possible that I'm getting old . . . and chivalrous?

JACK CARD.

Carolina Yarn Association Holds Its Annual Golf Tournament

FRED LEMMOND, representative of the Dixie Mercerizing Co., playing consistently good golf throughout the 36 holes of medal competition in the Carolina Yarn Association's second annual tournament, Sept. 18 and 19, carried off first honors with a net score of 124. He was awarded possession of the association trophy for one year and a set of sterling silver goblets. F. Osborne Pfingst, of the Greensboro (N. C.) Full Fashioned Hosiery Mills, won first prize for low gross on 36 holes with a score of 164, and received a handsome sterling silver platter. Pictures of outstanding foursomes will be published next week.

The outing was held at the Sedgefield Inn and Country Club, located mid-way between Greensboro and High Point, N. C., and both in attendance and in the variety and quality of entertainment, this year's tournament even surpassed the brilliant affair staged by the Carolina Yarn Association last fall. About 200 members and their guests were on hand for the banquet Saturday evening when trophies were awarded to the winners. Many handsome and valuable prizes, ranging from beautiful silver goblets, platters, cocktail sets and sherbet dishes to leather caddy bags, matched woods and sport apparel, were presented to the winning golfers. Dick White, of Aberfoyle Mfg. Co., acted as master of ceremonies during the banquet.

C. C. Harding, Charlotte, N. C., is president of the association, while Frank Shannonhouse, of Charlotte, is vice-president, and Joseph R. Morton, of Greensboro, treasurer. Ray Weaver, of Greensboro, acted as chairman of the entertainment committee, and Buck Cheatham, Burlington, N. C., headed the tournament committee.

In addition to winners of prizes noted above, the following received valuable and beautiful awards: J. J. Corrigan, Lock-Knit Hosiery Mills, High Point, N. C.; John K. Voehringer, Jr., Mock, Judson, Voehringer Co., Inc., of Greensboro; Buck Cheatham, Burlington, N. C.; Charles Hall, Chattanooga, Tenn.; Bill Evans, Pittsboro, N. C.; L. W. Parker, of High Point; George Sharpe, of Burlington; J. T. Cooper, of Greensboro; J. V. Garrett, of High Point; Emmett Venning, Mount Holly, N. C.; H. D. Blake, of Greensboro; L. D. Tucker, of Burlington; J. W. Lindsay, of High Point; William Nebel, of Charlotte; Ralph Holt, of Burlington; Albert Garrou, Valdese, N. C.; Keith Moore, of Burlington; W. L. O'Brien, Jr., Winston-Salem, N. C.; H. W. Davenport; Peter Graham, of Mount Holly; Bob Baker, of Greensboro; C. E. Beavan, of Charlotte; J. W. Woollen, of High Point; W. S. Dilling, Kings Mountain, N. C.; N. W. Murphy; F. D. Tillotson, of Winston-Salem; Bruce Griffin and Norman E. Griffith, of Charlotte; J. Lee Keiger, of Winston-Salem; Dwight Williams, New York, N. Y.; George Graves, of Charlotte; and Martin Foil, Kannapolis, N. C.

▸ Institute Committee Finds Nightwork Plans Working Well

The executive committee of the Cotton-Textile Institute, which met Thursday of last week in New York, reviewed exhaustively the progress and present situation as to the elimination of women and minors from night work in the cotton mills, a policy recommended by the institute at its last annual meeting. The committee, by unanimous recommendation, reaffirmed its confidence in the value of this policy and the continuance of its observance, and commended the industry for its wisdom in adopting the recommendation to so preponderant an extent.

The committee announced that over 80% of the entire industry, including 78.4% of mills classified as having run at night, was now pursuing this policy. Percentages of conformity for some of the manufacturing groups were announced as follows:

	Per Cent
Print Cloth	80
Narrow Sheetings	83
Wide Sheetings	91
Fine Goods	93
Bedspreads	86
Chambray-Ginghams	90
Ducks	80
Terry Towels	90
Tickings	83
Flannels	84
Carded Yarn	80
Combed Yarn	84

Representing the committee's views, George A. Sloan, president of the institute, stated that the committee was gratified to observe that this policy of discontinuing the night employment of women and minors was effectively discouraging night operation as a general practice. Various managements which have attempted to operate a balanced shift at night employing men only, are, he stated, reporting that they find it exceedingly difficult to do so under existing conditions.

▸ Southern Chemists to Meet

The Southeastern Section of the American Association of Textile Chemists and Colorists will meet Oct. 3, at 7 p.m. in the Ralston Hotel, Columbus, Ga. Charles B. Ordway is secretary.

▸ Pepperell Makes Cuts

The dividend declaration by Pepperell Mfg. Co. on Sept. 23 places the stock on a $4 annual basis, against $6 rate for last quarter and $8 rates previously. The company also cut wages and salaries by 10%.

▸ All-Bemberg Shoe Laces Offered

General Shoelace Co., of Louisville, Ky., has introduced all-Bemberg shoe laces for men's and women's shoes, promoting them as "Gold Bond" Bem-

berg shoe laces. The new laces are particularly suited to men's shoes, it was stated.

A display of the raw materials used in the manufacture of Bemberg yarn, skeins of spun yarn, fabrics of Bemberg and a spinnerette are on exhibition at the Commercial Museum in Philadelphia. Fabrics of Bemberg and cotton woven by students of the Textile School, North Carolina State College, are on display in the show windows of the offices of American Bemberg Corp., New York.

▸ Duck as Outside Finish for Dwellings

A unique and interesting departure in the selection of materials commonly used for the construction of homes and especially bungalows of the English type, is reported by C. K. Everett of the Cotton-Textile Institute. According to Mr. Everett, cotton duck has been found highly satisfactory as an outside finish material and has been used in place of stucco.

About seven years ago in a two-story bungalow under construction at LaGrange, Georgia, a local contractor conceived the idea of using canvas to obviate checks and cracks of stucco and the accompanying maintenance expense. Over the conventional wooden sheething of the second story gables, to which was affixed a 15-lb. saturated felt paper, cotton duck was applied and then given three coats of oil paint. No other waterproofing or preservative has been used and the duck is in good condition after seven years service, during which only one re-painting has been necessary.

▸ New York Knitting Mills to Make Children's Sweaters

A new line of children's sweaters named "Winnie-the-Pooh" after the character in A. A. Milne's popular stories, will be placed on the market by New York Knitting Mills Sept. 1, it is announced. This is the firm's first entry into the children's wear field. The sweaters will have two designs in half a dozen colors.

Tennessee-Eastman Goes Into Commercial Production of Acetate Yarn in October

THE Eastman Kodak Co., oldest American manufacturer of cellulose acetate, will begin in October turning part of its production of that material into acetate yarn. This step follows more than two years of experimental, semi-commercial yarn production and the completion this month of one of the largest acetate yarn spinning plants in the United States, at Kingsport, Tenn.

The Tennessee Eastman Corp., a wholly-owned Kodak subsidiary, will operate the yarn mill. Tennessee Eastman already manufactures cellulose acetate at Kingsport, and also the acetic acid and acetic anhydride which are used in making cellulose acetate. Because these facilities already exist for producing raw materials, the corporation is in a favorable position to manufacture cellulose acetate yarn.

Cellulose acetate used to make yarn at Kingsport will have characteristics similar to that going into the manufacture of photographic film. Film making is one of the most delicate chemical operations found in any industry and consequently requires the finest of materials and closely scrutinized production.

Acetate yarn is to be not a side issue with the Eastman Kodak Co. but one of the concern's main products. During the last two years, the new yarn has been tested and approved by consumers in every phase of the weaving and knitting industries. The favorable reception given the yarn indicates that a ready market awaits its production. Possession of a complete cellulose acetate plant of large capacity serving the Eastman Kodak Co.'s film requirements is counted important in assuring all users of Eastman acetate yarn a dependable source of supply.

Eastman Acetate Yarn will be distributed by the A. M. Tenney Associates, 171 Madison Avenue, New York. Mr. Tenney, who is the head of the firm bearing his name, and John C. Inge, sales manager, have both had many years of experience in supplying high grade synthetic yarns to the weaving and knitting industries.

Entry of Eastman into the acetate yarn field, after thorough market study, is interesting the industry as a reflection of the company's belief in a demand for yarn with special characteristics commanding a price premium.

Eastman acetate yarn will be sold in a full range of commercial counts from 150 to 45 deniers. It will be offered in skeins, and on spools, cops, and cones, including tinted cones for the knitting trade.

Experiments Started in 1907

The Eastman Kodak Co., having manufactured cellulose nitrate photographic film since 1889, began experiments on cellulose acetate in 1907. The first cellulose acetate film, marketed as a supplementary photographic material, was sold in 1909.

Because of cellulose acetate film's safety, this material was adopted as the only film for use with home movie cameras and projectors. Amateur motion picture photography has expanded rapidly since it was introduced in 1923. "Safety" film has been increasingly in demand also for X-ray use. The larger consumption of cellulose acetate thus necessitated in film manufacture at Rochester was the reason for building the Tennessee Eastman Corp.'s large cellulose acetate plant at Kingsport late in 1929.

Before that, Tennessee Eastman's entire function was producing, by wood distillation, various chemicals for film manufacture, including acetic anhydride; but until last year cellulose acetate was manufactured at Rochester, on a smaller scale, instead of at Kingsport. Raw material for Tennessee Eastman's wood distillation is drawn from timber resources of about 120,000 acres, owned or controlled by the corporation. A large sawmill, a 27-mile railroad, a water filtration plant with 2,500,000 gallons' daily capacity, a power house adequate for future requirements, and a plant site of 375 acres are included in the Eastman equipment at Kingsport.

Acetate rayon plant of Tennessee Eastman Corp., Kingsport, Tenn.

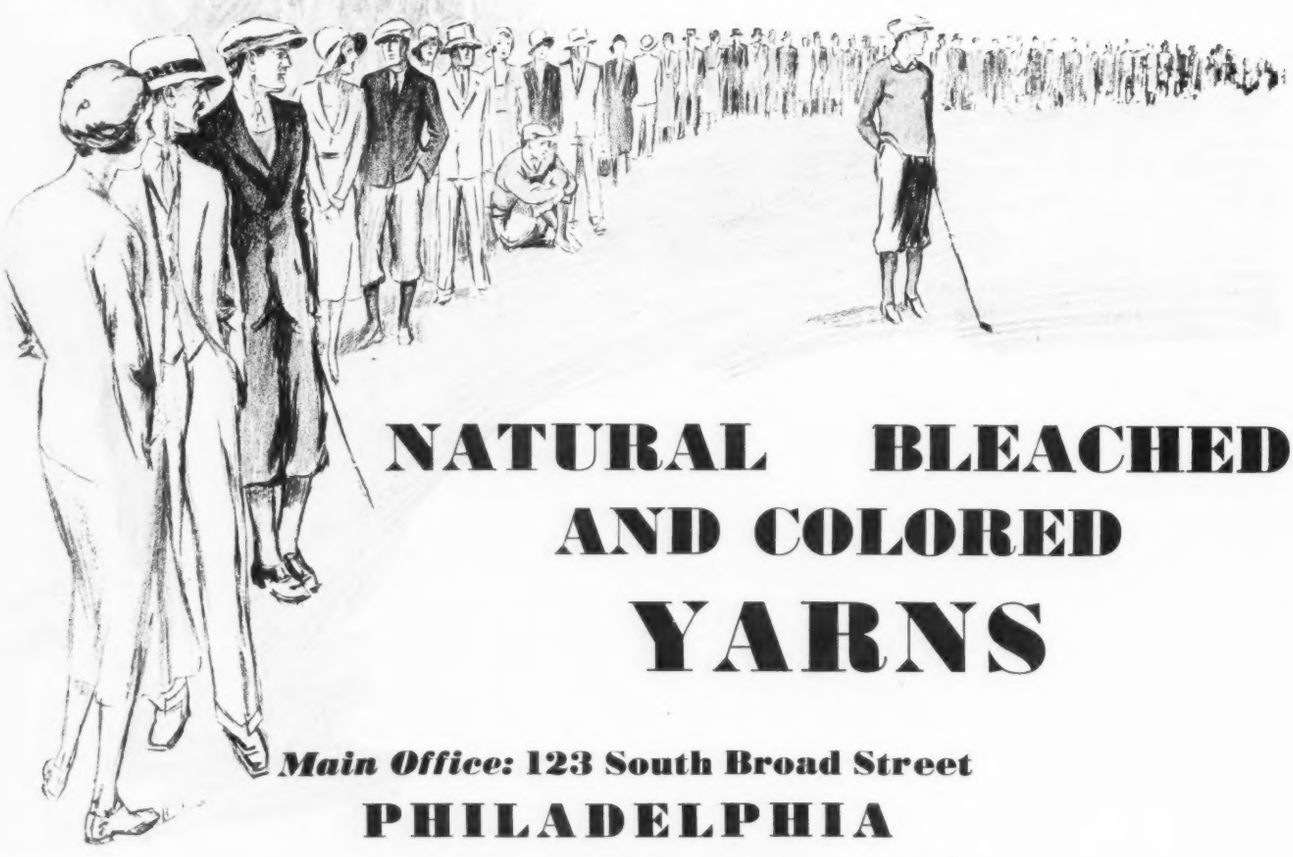
▸ August Activity of Finishers

The National Association of Finishers of Cotton Fabrics has issued its monthly statement of percentage of normal average capacity operated in the industry as follows:

	1931 (5 Weeks) August		1930 (5 Weeks)
White and dyed combined	50 (43%-white, 57%-dyed)	37	(47%-white, 53%-dyed)
Fast black	21	17	
Logwood and / or sulphur black	31	31	
Prints	60	41	
	1931 (4 weeks) July		**1930 (4 weeks)**
White and dyed combined	51 (45%-white, 55%-dyed)	37	(47%-white, 53%-dyed)
Fast black	20	15	
Logwood and / or sulphur black	33	31	
Prints	43	30	

Durene

REG. U.S. PAT. OFF.



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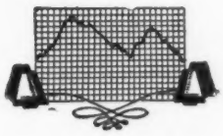
◆ *Survey of Fabric, Knit Goods, Yarn and Raw Material Markets* ◆

TEXTILE WORLD ANALYST



Low Values Needed to Give Assurance to Buying

By Dr. L. H. Haney

IT IS unusually difficult to find any positive factors in the current business situation which are definitely favorable. At first glance one might conclude that the figures recently issued by the Association of Cotton Textile Merchants indicate such a factor, for they show a decline in stocks of standard cloth at the end of August. But in August such stocks were about 9.4 times the average weekly sales during the month, against 8.5 times in July, and practically unchanged from a year ago. From the forecaster's viewpoint, the most important items are sales and unfilled orders, and both of these declined. Average weekly sales, at 26,889,000 yd. appear to have been the lowest on record. The unfilled orders for only 217,508,000 yd. compare with 226,422,000 yd. a year ago and are the lowest since July, 1926. Such being the case, one may be thankful that stocks have been reduced, but can hardly be reassured about the trend of the industry.

"Replacement Demand" Not General Business

In fact, we can hardly escape the conclusion that the spurt in "replacement demand" of the spring has not brought an upturn in general business. For a few months, tires, shoes, worsteds, and cotton cloth enjoyed increased sales. Some argued that consumers were at last buying and that, as in 1921, this would lead the way out and up. Now we find the rubber and shoe industries letting down. The wool manufacturing industry appears to be finding difficulty in keeping the pace and the London auctions indicate a decline in foreign wool markets. The cotton textile figures show a distinct relapse in buying during July and August and gray goods have fallen in price.

It is fairly clear that waves of "replacement demand" may come and go without bringing general business recovery. Partly they represent delayed restocking on the part of distributors without any great change in consumer buying. We must admit that down to mid-September there has been no indication of the usual seasonal gains in industrial activity. It is highly unusual to find steel production down in August and showing no rise by Sept. 15. The same is true of the August decline in factory employment and payrolls.

New Lows in August

One of the accompanying charts shows how industrial production has declined since the peak last April, and it is highly probable that the index for August when it comes out will show a new low. Even if the "long-time trend" is now downward as suggested by the dotted line, industrial production is now about 25% below normal. Bradstreet's price index made a new low on Sept. 1, but it can be said in this case that the decline has become more gradual since last December.

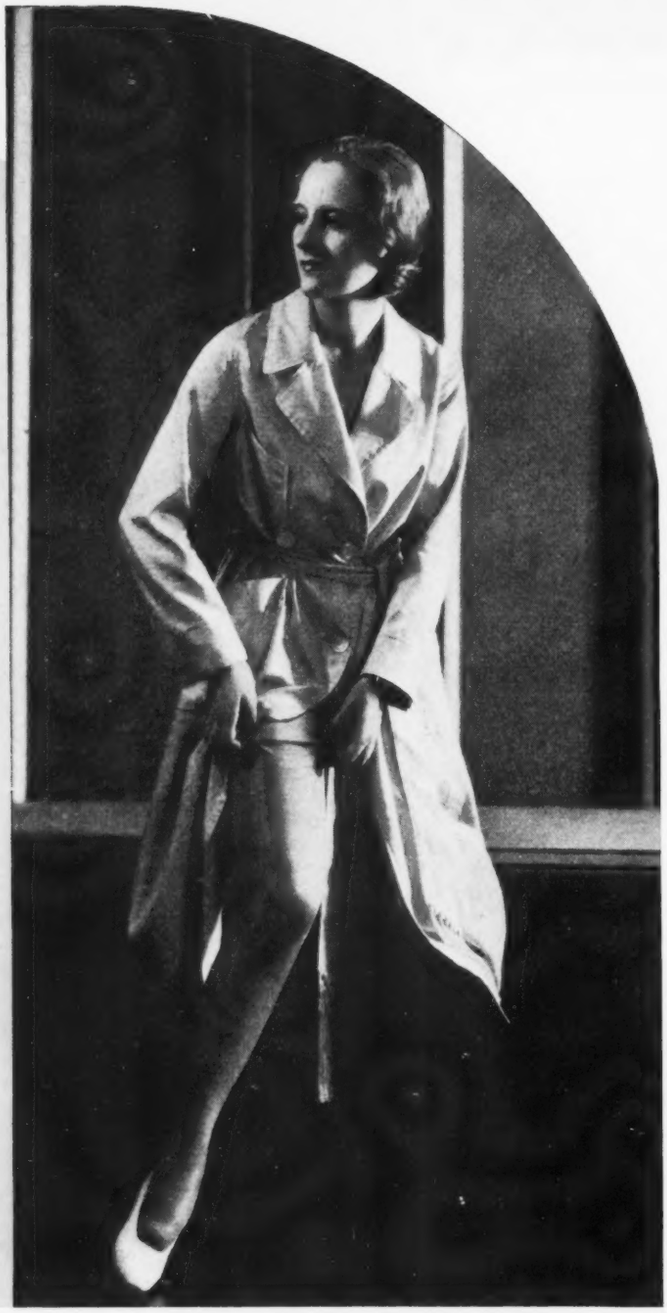
But some price maladjustments still exist and a majority of basic commodity markets show declines from week to week. All important statistical barometers in August made an unfavorable showing. New lows were touched by adjusted indexes of building contracts awarded, railway freight traffic, department store sales, and foreign trade (both exports and imports). Unfilled orders for steel, locomotives, machine tools, and cotton cloth declined. Both stocks and bonds have been heavily liquidated as it has become clear that any seasonal recovery in business this fall is to be spotty and delayed.

Extreme Pessimism Not Warranted

It is difficult to hold the balance in one's judgment and keep thoughts and sentiment on an even keel. Hopes when disappointed tend to plunge into pessimism. Waiting, especially when attended by great uncertainty, is always trying. Accordingly, we find an extraordinary amount of pessimism at the present time, and the point is well taken

Summary: **The final readjustments are being made in business which will liquidate credit and bring the values of commodities, real estate, securities, and labor so low that they may be bought with reasonable assurance. Then the eagerness of individual business men to make money will furnish the stimulus for general recovery. Some further recession is indicated for the near future and the depression will last at least till spring. Political uncertainties and threats of unsound inflationary schemes for "relief" are the only things now in sight which may prevent recovery next spring. The sooner we reassure business enterprise and capital that these schemes will be voted down, the quicker business confidence will return and business revival begin.**

The analysis and forecast by Dr. Lewis H. Haney, director, New York University, Business Research Bureau, which regularly appears on this page, considers various branches of the textile industry from week to week. The conclusions reached in the Analyst are mostly forecasts and generally apply to a time two or three months ahead. The Analyst is based on statistical data and does not reflect temporary trade sentiment.



Women's Hosiery of DIXIE *Durene*

Dixie durene offers knitters of women's hosiery a variety of counts, spun from selected long staple cotton, and prepared particularly for hosiery production. There are Dixie durene yarns especially adapted to knitting full-fashioned or seamless stockings of all Dixie durene construction. There are others for plaiting, and still others carefully spun and wound for seaming and looping.

The Dixie representative in your territory will gladly submit samples of any of these types for a trial run in your mill.

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DIXIE DURENE, *A Product of Controlled Manufacture*

that this is merely going to the opposite extreme from the optimism of the boom period. Apparently, it is always necessary that extreme pessimism prevail in order to force men to make the final economies and readjustments that are required for recovery.

The point should be emphasized, however, that in a very real sense there is no uncertainty. Cyclical depressions such as this one, by their very nature, always have and always must come to an end. The only uncertainty lies in the answer to the question, when? It should be remembered that the depressions of the '70s and the '90s in the last century were in many ways as prolonged and as deep as the present. In a financial and political way, perhaps they were worse, but the end came.

Note, too, that *the end came in those cases with the restoration of confidence in finance and politics. They came just as soon as the inflationary scheme of those days were defeated. In 1878 the "greenback movement" was finally defeated and specie payment resumed. In 1896 Bryanism and bi-metalism were defeated.*

Now we are again threatened with unsound schemes for reserve bank inflation, huge bond issues, etc. The political situation is beclouded. By the time that the sound and sane thought of the nation has met and defeated the forces of inflation and doles, confidence will return and business recover again.

Final Readjustments Prepare Way for Recovery

For the near future, all statistical indications point toward a little further recession before we touch bottom. Few now question the probability that depression will prevail through the fall and winter months. But why not be getting ready for recovery in the spring? The basis for recovery is being laid in the present deflation of values, reductions in costs, and general liquidation of debts. Already signs of a less rapid decline in commodity price averages and greater stability are appearing. Cotton, for example, is certainly very close indeed to bottom levels. In an accompanying chart, it will be noted that all textile material markets were stronger in July than the general average (though far below their normal relation to the general level of commodity prices), and the same was perhaps true of wool and silk in August, while the sharp break in cotton must nearly discount the unexpectedly large crop. It seems that the farce of maintaining in certain protected groups, high wage rates which cannot be paid in actual wages, is about to be abandoned. As false hopes are abandoned, may sound ones not take their place?

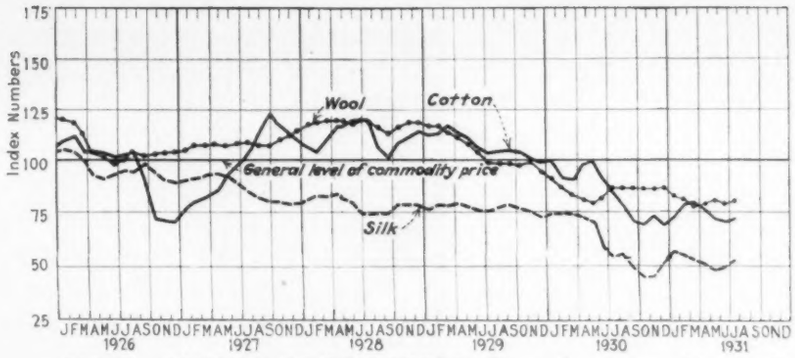


FIG. 1. TEXTILE PRICE LEVELS—Chart shows how chief textile fibers compare (1) with the general level of commodity prices and (2) with each other. The 100 = average of all commodity prices, and fibers are normally priced when near the general level. The several fiber price curves are so placed that normally they should be close together.

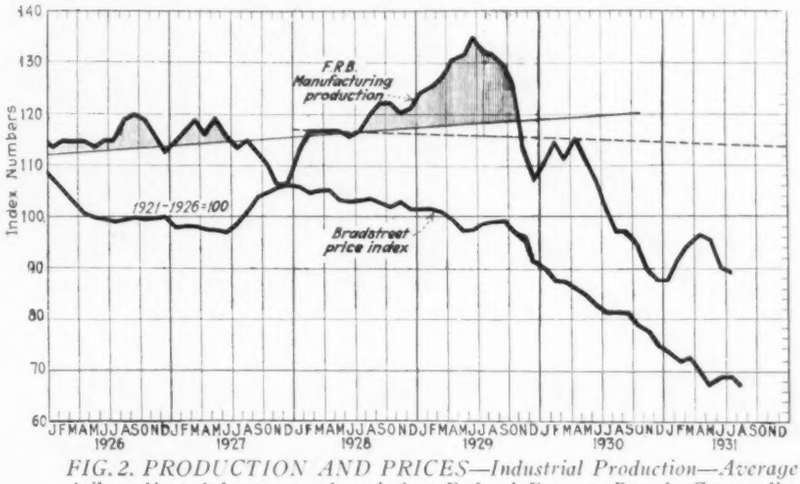
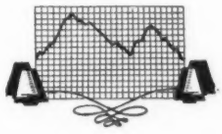


FIG. 2. PRODUCTION AND PRICES—Industrial Production—Average daily, adjusted for seasonal variation, Federal Reserve Board; Commodity Price Index—End of month, Bradstreet's Journal. Average 1921-1926 = 100 for both indexes.

We may well remember that millions of business men, big and little, are planning and scheming to find some way to make more money. This is all the stimulus we need. These men will find the way. Once confidence is restored by increased price stability and less fear of unsound political action, the enterprise, capital and labor of the nation will certainly shake off the bonds of depression. Aside from cheerfully bearing the burden of supporting those temporarily in distress, all that is needed is to avoid unsound inflationary measures and to go through with the now relatively small amount of liquidation and readjustment which are required to restore a basis for equilibrium. Some morning we will wake up to realize that many things are so cheap that we can not afford *not* to buy. The forces of unrest and political radicalism will be defeated, as in 1896. Then the force of individual initiative will push up.

Market Briefs



Cotton: *Rallies from new lows following decline in sterling.*

Cotton Yarns: *Only scant interest with buyers generally in command.*

Cotton Goods: *Inactive and unsettled market; buyers waiting.*

Wool: *Some evidence of weakness after quiet period.*

Worsted Yarns: *Steady with spot interest predominating.*

Woolen Goods: *Spring prices 8% down; little buying.*

Silk: *Yokohama softening brings 10c. drop in prices.*

Silk Yarns: *Markets quiet; prices steady.*

Silk Goods: *Active movement of all lines at satisfactory levels.*

Rayon: *Demand slackens but outlook continues good.*

Knit Goods: *Wage controversy and price cuts have slowed up hosiery movement; spring underwear prices 10% down. New swimsuit lines open slowly.*

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YARNS AND RAW MATERIALS

TEXTILE WORLD ANALYST

◆Cotton Yarns Find Limited Demand

LIMITED interest marks the cotton yarn market. Inquiries are confined to small lots of spot yarns, with buyers in command of the situation. In a few staple counts in general demand, stock lots have been well depleted and these cannot be had at any concession in price. For example, sales are noted of carded knitting yarns at 14 to 14½c. basis 10s, with the higher figure the average. However where a manufacturer needed a small lot at once, he paid a price on a basis of 16c. for 10s.

Despite slack demand, prices have not declined materially as they already offer a very narrow margin over the cost of cotton. One house reported two sales placed with spinners for 20s-2 warps at 16½c., where 17c. had been asked two weeks ago; 30s-2 warps sold at 20 to 20½c. However, dealers state there is really not enough business doing to indicate any definite price level. Weaving yarns are still slow, and the few small sales reported are considered speculative on account of the attractive low prices.

Carded knitting yarns for heavy weight underwear are still finding satisfactory deliveries against old orders. While some report less pressure for these yarns, others report no let-up as yet. There is little new business, however; 30s extra carded sold at 23 and 23½c.; 18s at 16½c.

Combed yarns continue to show easing prices with limited sales. Mercerized yarns are unchanged, although there have been some slight improvement in deliveries in certain quarters. New business is still lacking in volume.

◆Cotton Confused by Sterling Situation

THE feature in the cotton futures market during the week was the financial developments in Great Britain over last Sunday with the suspension of the gold basis and depreciation in the pound. The immediate effort of this action was its reaction on the parity between the New York and Liverpool markets. Logically enough depreciation in the pound led to a broadening of the the difference between Liverpool and New York quotations. Liverpool for some time previously had been selling far below a normal parity with American markets owing to the presence there of outside growths and the depressed condition of the Lancashire textile industry.

A first step in the direction of a readjustment based upon lower sterling rates was made on Saturday when the pound declined, Liverpool advanced sharply and the local market instead of responding, was lower. On Monday the readjustment went still further with the difference broadening out to about 134 points, which seemed almost sufficient to discount the break in sterling but which left Liverpool as far as ever below a shipping difference. Then the decline in this market was checked by heavy buying to undo the old straddie accounts, with selling in Liverpool against these purchases.

In a general way, the temporary suspension of the gold basis in England is expected to react favorably on British exports including cotton goods on the theory that while raw material costs will increase, the cost of other factors entering into manufacture, in terms of gold, will be smaller and that Manchester will thus be enabled to compete more strongly in its world outlets.

Texas has passed State legislation providing for a restriction of the cotton acreage to 30% of the area under cultivation in all crops and providing for rotation of crops, basing it upon the right to conserve natural resources. Its constitutionality will probably be questioned, and if so, will be defended on that basis.

◆Worsted Yarns For Prompt Delivery

LIMITED interest in worsted yarns is reported at present. Continued hot weather is having some effect in holding up business, especially in the sales of cloaks, coats and suits, and this of necessity has its effect in slowing up the movement of piece goods. This is felt to be a temporary condition, but nevertheless much time is being lost in getting orders under way. Considerable interest has been expressed lately in the continued expansion of the large chains handling men's clothing. The opinion is expressed that with this expansion, there is bound to be increased advertising and other sales efforts to push clothing, all of which will have a helpful effect on fabrics.

New business in men's wear and dress goods is limited and slow in developing. Some specifying is reported in yarns for men's wear, but no real volume of business has been done. Dress goods also are still dragging although certain mills are enjoying fair trade. However there have been no definite indications as to where the big volume of buying will point. As a consequence there has been little real activity in new orders for weaving yarns.

Knitting yarns also are rather inactive when it comes to volume buying for new business. Scattered sales of spot lots or to fill in form the chief activity today. Hot weather has slowed up sales of sweaters, but manufacturers of sport coats are busy getting out orders, so that specifications against yarn orders have been coming in satisfactorily. In swim suits, only a few lines are open, but indications are prices will be about 5 to 10c. lower than last season. Some of the manufacturers of better class jersey cloth are reported interested in using two ply yarns, such as 2-50s in place of singles, but it is expected the single 26s and 28s will be used by the average mill.

◆Less Activity in Raw Wool

OUTSIDE of a sudden spurt in demand for scoured wools the raw wool market has drifted without much activity during the last week. As might be expected, prices have tended to soften, although there is no real bear movement. Practically all dealers have enjoyed good business and are not inclined to force sales during the off season. Territories are in restricted though fairly steady demand and where there is real buyer interest dealers have shaded quotations about 1c. per lb. below last week's levels. Three-eighths bloods are still scarce and steady in price, but fine wools are slow.

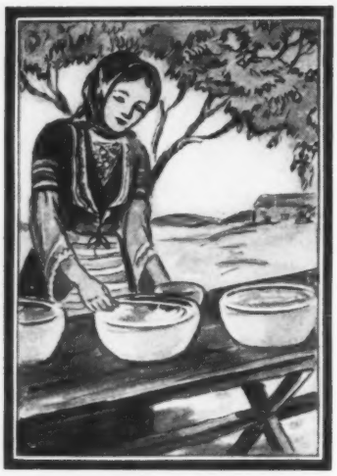
The London auctions have developed as expected and there is in evidence no movement radical enough to have any real effect on domestic prices, protected as they are by the tariff. There is some interest in South American wools which can be substituted for the scarce three-eighths blood domestics. Top makers are short of new business although the rate of activity of combs still remains relatively high.

The situation in rags, wastes and reworks is unchanged. Prices are steady in the face of light demand with choice lots faring better than average grades. The lifting demand for women's wear woolen fabrics continues to encourage the trade.

◆Thrown, Spun Silk Demand Sluggish

THROWSTERS and spinners have difficulty in moving stocks. All silk yarns are backward, which may be ascribed to the unseasonable weather. Velvet production has helped spinners in a small way but their real demand from broadsilk mills is not materializing. These factors now are resigned to a negligible fall season and look hopefully toward November to mark the start of spring business. Stocks of spun yarn

SECOND ONLY TO CREATIVE GENIUS IS THE CHOICE OF WORTHY MATERIAL



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For centuries Attar of Roses has been the most famous of all perfumes. While skill in macerating and distilling roses became an art, only one particular variety of rose was ever found that could produce this incomparable fragrance.

Product saleability increased by superior qualities of Whitman Yarns

The result of extraordinary care in selecting of raw material, and correct processing of Whitman Yarns contribute mightily toward the saleability of your finished product • Every effort is concentrated on producing Whitman Yarns especially adapted to modern weaving or knitting requirements—yarns that give utmost satisfaction to both maker and user of textiles • To accomplish this the Whitman group of mills utilize the latest developments in spinning equipment . . . adhere to the highest standards of selecting raw wool and cotton . . . carry laboratory control of processes to an unusual degree . . . and draw upon years of experience in furnishing the industry with cotton and worsted yarns of recognized merit.

Co-ordinating the services of this group of famous yarn mills:

MONOMAC SPINNING CO.
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Bradford Spun Worsted

•

ACADIA MILLS
Mercerized Cotton

•

NONQUITT MILLS
Fine Combed Cotton

•

CRAMERTON MILLS
Fine Combed Cotton

•

TALLAPOOSA MILLS
MARY LOUISE MILLS
High Quality Carded

WILLIAM WHITMAN COMPANY, INC.

COTTON and WORSTED YARNS

BOSTON	NEW YORK	PHILADELPHIA	CHICAGO	CHARLOTTE
78 Chauncy St.	261 Fifth Avenue	1600 Arch Street	300 W. Adams St.	Commercial Bank Bldg.

FABRICS AND KNIT GOODS

TEXTILE WORLD ANALYST

are moderate. Throwsters report a light call from hosiery mills and fabric weavers but business is far below normal.

◆Silk Declines After Unsteady Week

AFTER a week of sharp fluctuations, raw silk has steadied at levels 5 to 10c. below last week. The technical position is somewhat improved and New York importers regard the general tone as favorable. Broadsilk movement is active; weavers have increased production and are in the market for substantial quantities of raw silk. Future business continues weak at that end, but there is a good spot call. The firmness prevailing in woven fabrics is expected to make for a steadier primary market when October opens.

Hosiery mills show moderate interest; there was a fair demand this week—less than had been looked for, but enough to bring encouragement. Hosiery production is cautious and the unsettled labor and price situation makes these knitters hesitant about covering ahead on their silk requirements.

Stocks in Yokohama are increasing which has had a softening influence on prices there. Several sharp drops featured the week in the Japanese market and some unsteadiness there may be looked for until the end of the month.

◆Warm Weather Slows Up Rayon Yarn Sales

UNSEASONABLE weather having slowed up sales of rayon merchandise demand for yarn has slackened somewhat, but the market looks for a pickup once the weather gets cool. The decline in orders has been merely comparative; actually buying is steady and rayon producers are writing orders for the last quarter; some companies have a fair percentage of their December output covered. Knitters and weavers complain of slower movement of their own stocks and have eased up on production.

The mills are still confident of a healthy season and prospects point to increased buying of yarn soon. Production of synthetics is still close to capacity and there is no early likelihood of curtailment. However, rayon companies are watching sales trends closely; they are determined not to accumulate surplus and any real falling-off in sales would be followed by a drop in rayon output, it is believed.

Better Call for Waste

Demand for rayon waste is better than it has been but orders are still backward; garnetters and topmakers have placed some small contracts and are inquiring actively. Price is emphasized by buyers and dealers are resisting an effort to force down their lists. Stocks are light which has helped to strengthen the dealers' position. Market sentiment as regards outlook is uncertain. Converters get little immediate encouragement from their outlets but are hopeful of a pick-up in October.

◆Cotton Goods Fail to Increase Activity

THE British move to take the pound sterling off the gold basis had a restraining effect on a cotton goods market which had gone through so many quiet weeks that traders were hopeful that it was at last about to come up to breathe. The "fall upturn" seems further postponed. The opinion of many authorities upon the British action is so generally favorable that the adverse reaction on cotton goods may soon be shaken off.

Gray goods were quiet and buyers were interested only in seeing whether they could get goods below the generally quoted basis. Despite the decline in cotton to new 31-year lows early in the week, print cloths and sheetings have been held firmly on last week's basis. Cotton seemed firmer as the week progressed, but the immediate future of goods hinges directly on which way cotton goes.

Trade in finished goods, stimulated for a time by the low prices named on such lines as bed sheets and pillow cases, fell off this week. Sellers are turning attention more than ever to credits and it is understood that extreme care along these lines is restricting even the volume of business which might otherwise be done.

◆Wool Goods Mills Show Spring Lines

INTEREST in woolen and worsted goods centers on spring openings this week. Numerous important companies announced their spring prices and the levels are reported to average 8% below last season. Buyers are gathering in New York and are showing interest in the offerings; whether this will be followed by quick coverage is debatable. Mill agents believe the cutters will buy early due to the late openings and the backwardness of both the fabric and the garment season.

Spot business is largely a price proposition and even with concessions there is little movement, as buyers are suspending activities until they have seen all the new lines and compared price levels.

◆Drastic Curtailment Helps Broadsilks

BROADSILK stocks are moving healthily and prices are somewhat firmer than at the opening of the season. While the margin of profit is narrow, it has held steady and the outlook for the next few weeks is very satisfactory. The writer is leaning intentionally to the conservative side. Transparent velvets sell at boom pace; leading manufacturers ask three to four weeks for deliveries and some firms are declining any new velvet business before the end of October. Other fabrics are almost equally strong.

Even more significant than the present firmness is the announcement that numerous fabric manufacturers plan a drastically curtailed production of spring prints, so they will be producing virtually on order only.

◆Hosiery Hesitant; Underwear Prices Cut

IT IS inevitable that the union wage cut now reported in effect in some full-fashioned hosiery mills should have an adverse reaction on hosiery sales due to price-cut expectations, but the let-up has not been as general as some expected. Demand continues active at some ends, chiefly for hosiery retailing at $1.25 upward; statements by some companies that they would not reduce prices were followed by cuts on the part of some other firms. Mills selling low-priced hosiery find their end-September business less active than it should be. Half-hose moves steadily but prices continue very unstable and competition is so keen as to allow for the slightest possible profit margin.

Certain mills have reduced prices of their spring rayon underwear lines 8 to 10% and spring business to date is slow. The warm weather has discouraged buyers from covering ahead; indeed, it has slackened the call even for heavyweight underwear for immediate delivery. Mills still have considerable winter-weight business on their books however, and once the weather becomes seasonable some spirited reordering is looked for. Underwear outlook for all lines is uncertain due to the weather contingency, but stocks are light which is having a steadying effect on prices.

Movement of 1932 swimsuit lines has been held up by the delayed openings of mills that sell direct to retailers. White suits for men are receiving more attention and some manufacturers have made last-minute additions to their new offerings. Heavyweight sweaters move well despite the warm weather and medium-weights also are in good call; stocks are moderate.

Before Spun Rayon becomes common . . . cash in on Quitex

The market for spun rayon fabrics is barely scratched. The yarn itself is comparatively new. It has qualities unlike any other yarn made. And being new and unusual, it has that arresting power which makes sales. The casual shopper is stopped by the rich, soft feel and the dull luster of these fabrics. And that's the first step to a sale.

A group of mill men have developed profitable numbers with Quitex Spun Rayon. They chose Quitex because they were confident that any yarn spun by Quissett would be spun right . . . would be smooth running . . strong . . true in twist. The fact that these mill men continue to use Quitex in ever increasing quantities proves that their confidence was well placed.

While spun rayon is still uncommon, cash in on the ready market for fabrics knitted or woven from Quitex. Use Quitex for working in novelty stripes or unusual figure effects. And watch your fabric sales move up. Write or phone for Quitex samples.

Quissett Mill
New Bedford, Mass.
Wm. M. Butler, Pres.
Edward H. Cook, Treas.
Thomas F. Glennon, Agent

Our quotations based on
Cost + a reasonable profit.

Quitex Spun Rayon
by the spinners of
Quissett Cotton Yarns

QUOTATIONS

at close of business, Sept. 23, 1931
Prices cover average qualities unless otherwise stated

Cotton Goods

	Sept. 23	Sept. 16	Sept. 24, 1930
PRINT CLOTHS			
27 -in., 64x60, 7.60	2¾c.	2¾–2⅞c.	4½c.
38½-in., 64x60, 5.35	4 c.	4 c.	5½c.
39 -in., 68x72, 4.75	4¼–4½c.	4¼c.	6½c
39 -in., 72x76, 4.25	5 c.	5¼c.	6¼–6½c.
39 -in., 80x80, 4.00	5 1/16c.	5⅛c.	7⅛c.
BROWN SHEETING			
36-in., 56x60, 4.00	4¼c.	4¼–4⅜c.	6½c.
36-in., 48x48, 3.00	4¼c.	4¼c.	7⅛–7½c.
37-in., 48x48, 4.00	4¼c.	4¼c.	5⅛–5½c
PAJAMA CHECKS			
36½-in., 72x80, 4.70	5–5½c.	5½c.	6 c.
36½-in., 64x60, 5.75	4¼c.	4½c.	5 c.
MISCELLANEOUS			
Drills, 37-in., 3 yd.	5⅛c.	5⅛c.	7⅛c.
Denims, 2.20	9½c.	9½c.	12½c.
Tickings, 8 oz.	13 c.	14 c.	16 c.
Standard prints	7 c.	7 c.	8 c.
Eastern staple ginghams, 27-in.	7½c.	7½c.	10 c.

Cotton Waste

Peeler comber	5½– 5¾
Peeler strips	5½– 6
Sak. comber	5½– 5¾
Choice willowed fly	2 – 3
Choice willowed picker	2 – 2½
Sak. strips	6½– 9
Linters (mill run)	1½– 2½
White spooler (single)	5 – 5¼

Cotton Yarn

CARDED (Average Quality)
Double Carded 2c.—4c. higher according to quality

SINGLE SKEINS OR TUBES (Warp Twist)

4s to 8s	$0.14	22s	$0.18– .18½
10s	– .14½	24s	– .19
12s	– .15	26s	– .20
16s	– .16	30s	– .21½
20s	– .16½	40s ex. qual.	.32– .33

TWO-PLY SKEINS AND TUBES

8s-2	$0.14	26s-2	$0.19½
10s-2	– .14½	30s-2	.20 – .20½
12s-2	– .15	36s-2	– .27
14s-2	– .15½	40s-2	.28 – .29
16s-2	– .16	40s-hi.brk.	.32 – .33
20s-2	– .16½	50s-2	– .37
24s-2	– .19	60s-2	– .40

SINGLE WARPS

10s	$0.14½	24s	$0.18½
12s	– .15	26s	– .19½
14s	– .15	30s	– .21½
16s	– .15½	40s.ex.qual.	– .32½
20s	– .16½		

TWO-PLY WARPS

8s-2	$0.15	24s-2	$0.19
10s-2	.15 – .15½	26s-2	– .20
12s-2	.15½	30s-2	.20 – .20½
14s-2	.15½– .16	40s-2 ordin.	– .29
16s-2	.16½	50s-2	– .37
20s-2	.16½	60s-2	– .40

8s-2 and 4-ply skeins and tubes; tinged, 14; white, 15; waste, 13

HOSIERY CONES (Frame Spun)

8s	$0.14	22s	$0.18
10s	– .14½	24s	– .19
12s	– .15	26s	.19½– .20
14s	– .15½	30s tying	.19½– .20
16s	– .16	30s reg.	.21 – .22
18s	– .16½	30s ex.qual.	.23 – .23½
20s	– .17	40s	– .29

COMBED PEELER (Average Quality)

TWO-PLY—(Knitting Twist) Cones

20s-2	$0.26 – .27	60s-2	$0.46
30s-2	.31 – .32	70s-2	.56 – .57
36s-2	– .34	80s-2	.67 – .68
40s-2	– .36	90s-2	90 – .95
50s-2	.38 – .40	100s-2	1.03 –1.05

WARPS, SKEINS AND CONES

TWO-PLY—(Warp Twist)

20s-2	$0.26 – .27	60s-2	$0.45 – .48
30s-2	.31 – .32	70s-2	.56 – .57
36s-2	– .35	80s-2	.66 – .68
40s-2	– .36	90s-2	.93 – .95
50s-2	.38 – .40	100s-2	1.03 –1.05

SINGLES

12s	$0.21 – .21½	30s	$0.30 – .30½
14s	.21½– .22	38s	.33 – .34
16s	.22 – .22½	40s	... – .35
18s	.22½– .23	50s	.38 – .39
20s	.23½– .24	60s	.46 – .47
24s	.26 – .26½	70s	.56 – .57
28s	.28½– .29	80s	.66 – .67

MERCERIZED CONES—(Combed, Ungassed)

26s-2	$0.45 – .47	90s-2	$1.18 –1.23
30s-2	.48 – .50	100s-2	1.48 –1.53
36s-2	.50 – .52	120s-2	1.88– 1.93
40s-2	.52 – .54	30s-2	– .59
45s-2	.54 – .56	40s-2	– .63
50s-2	.56 – .58	50s	.68 – .70
60s-2	.62 – .64	60s	– .78
70s-2	.75 – .77	70s	.88 – .90
80s-2	.87 – .88	80s	1.03 –1.08

Cotton Prices and Statistics

FLUCTUATIONS OF FUTURES

	Closed Sept. 17	For Week High	For Week Low	Closed Sept. 23	Net Ch'ge.
September	6.42	6.42	6.07	6.36	—0.06
October	6.48	6.58	6.05	6.40	—0.08
November	6.60	6.60	6.20	6.52	—0.08
December	6.73	6.80	6.18	6.64	—0.09
January	6.83	6.90	6.35	6.74	—0.09
February	6.91	6.91	6.54	6.83	—0.08
March	7.01	7.09	6.55	6.94	—0.07
April	7.08	7.08	6.72	7.02	—0.06
May	7.17	7.26	6.76	7.12	—0.05
June	7.26	7.26	6.87	7.22	—0.04
July	7.36	7.41	6.93	7.30	—0.06

SPOT FLUCTUATIONS FOR WEEK
(Middling)

	New York	New Orleans	Liverpool
Thursday, Sept. 17	6.55	6.27	3.73
Friday, Sept. 18	6.40	6.08	3.74
Saturday, Sept. 19	6.25	5.90	3.76
Monday, Sept. 21	6.20	5.94	4.20
Tuesday, Sept. 22	6.25	5.98	4.12
Wednesday, Sept. 23	6.55	6.23	4.49

FOREIGN COTTONS

Egyptian Cotton

Alexandria Exchange, Sept. 22		Change
Nov. Sak	12.39	+1.17
Oct. uppers	8.44	+0.32

Oct.-Nov. Shipment c. i. f. Boston
(Tariff not included)

Fully good fair Sak	15.25
Fully good fair to good Uppers	11.15

(By Anderson, Clayton & Co.)

Foreign cottons F. O. B. New York, Cents	
Peruvian Tanguis Strict Middling	17
Peruvian Pima No. 1	16½
Peruvian Moderate Rough	13
Peruvian Full Rough	17
China Tientsin No. 1	9¼
India Rough	7 to 9
India Smooth	7 to 9

(By Bruns-Nordeman Co.)

MOVEMENT INTO SIGHT

	This Year	Last Year	Year Before Last
Week ended Sept. 18	343,000	527,000	526,000
Season	*1,043,000	2,107,000	1,884,000

*16,000 added.

WORLD VISIBLE SUPPLY

	Today	One Year Ago
Interior towns and ports of U.S.*	3,642,000	2,963,000
Afloat to and at ports of Europe	1,013,000	1,017,000
Afloat to and at ports of Orient	381,000	198,000
Total	5,036,000	4,178,000
	Increase	Increase
Change during week	139,000	350,000

*Includes afloat in New York.

FORWARDING TO MILLS OF WORLD

	This Year Week	This Year Season	Last Year Week	Last Year Season
No. States, U.S.	14,000	*82,000	9,000	65,000
So. States, U.S.	73,000	*379,000	66,000	288,000
Total U.S.	87,000	*461,000	75,000	353,000
Great Britain	14,000	115,000	15,000	99,000
Continent	53,000	322,000	70,000	412,000
Orient	47,000	274,000	13,000	83,000
Canada and other America	3,000	15,000	4,000	19,000
Total Foreign	117,000	726,000	102,000	613,000
World total	204,000	*1,187,000	177,000	966,000

*16,000 added United States.

EXPORTS FROM UNITED STATES

	This Year Week	This Year Season	Last Year Week	Last Year Season
Total	126,000	489,000	201,000	854,000

AVERAGE PRICE OCT.-NOV. SHIPMENT
HARD WESTERN COTTON
F.o.b. New England

	Middling	St. Middling
1 1/32-in	8¼–8½c.	8½– 8¾c.
1⅛-in	8½– 9c.	9¼– 9½c.
1 3/16-in	10½–10¾c.	11¼–11½c.
1¼-in	14 –15c.	15 –16c.

Basis on New York, December, 6.38.

SPOT FLUCTUATIONS AND STOCKS

Markets	Middling Sept. 16	Middling Sept. 23	Stocks Sales	Stocks This Week	Stocks This Season
Galveston	6.45	6.35	1,744	467,001	275,906
New Orleans	6.31	6.23	18,638	521,235	382,123
Mobile	6.05	5.95	1,488	204,658	56,215
Savannah	6.25	6.07	1,829	369,921	233,101
Norfolk	6.31	6.31	1,013	47,702	47,504
New York	6.60	6.55	4,950	229,251	233,495
Augusta	6.13	6.00	3,099	82,771	91,019
Memphis	5.45	5.40	32,645	78,352	153,392
St. Louis	6.05	5.75	.....	.....	1,601
Houston	6.35	6.25	122,072	801,789	859,138
Dallas	5.85	5.70	149,185	10,527	14,134

Liverpool 4.49d.

DIFFERENCES ON AND OFF MIDDLING

WHITE GRADES

	Dallas	Memphis	Montgomery	Augusta	Average
M.F	.75†	1.00†	.75†	.75†	0.83†
S.G.M	.60†	.75†	.65†	.63†	.67†
G.M	.50†	.50†	.45†	.50†	.48†
S.M	.35†	.25†	.25†	.25†	.29†
S.L.M	.50*	.40*	.50*	.50*	.47*
L.M	1.00*	.90*	1.00*	1.00*	.97*
S.G.O.**	1.50*	1.25*	1.50*	1.50*	1.48*
G.O	2.00*	1.50*	2.00*	2.00*	1.98*

YELLOW TINGED

G.M	.40*	.35*	.50*	.50*	0.46*
S.M	.65*	.60*	.75*	.75*	0.70*
M.**	1.00*	.75*	1.00*	1.00*	.99*
S.L.M	1.50*	1.25*	1.50*	1.50*	1.52*
L.M	2.00*	1.50*	2.00*	2.00*	1.97*

YELLOW STAINED

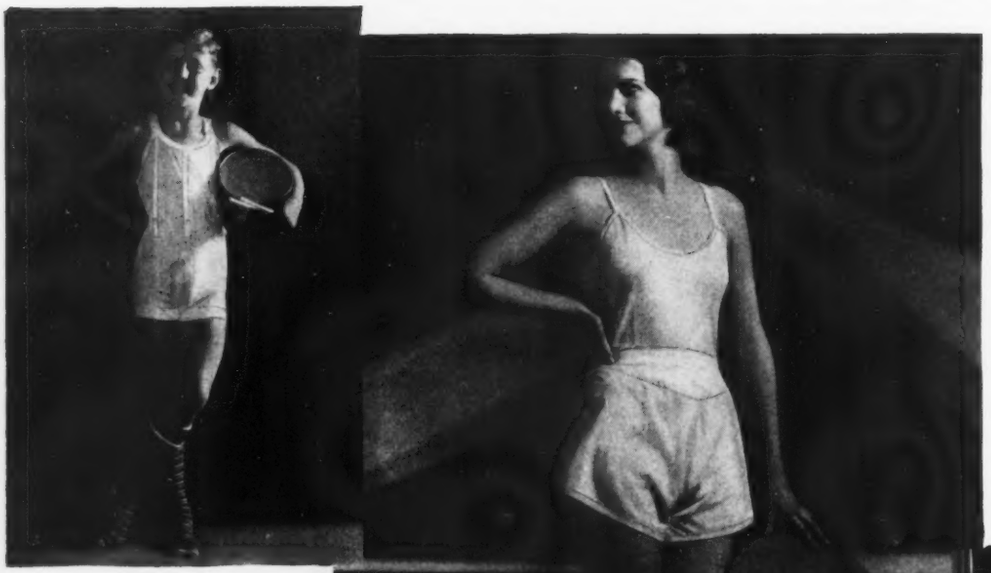
G.M	1.00*	1.00*	1.00*	1.00*	.98*
S.M.**	1.25*	1.50*	1.25*	1.25*	1.32*
M.**	2.00*	1.75*	2.00*	2.00*	1.99*

BLUE STAINED

G.M.**	1.00*	1.00*	1.00*	1.00*	1.03*
S.M.**	1.50*	1.25*	1.50*	1.50*	1.48*
M.**	2.00*	1.50*	2.00*	2.00*	1.93*

**Grades not deliverable on contract. †On Middling. *Off Middling.

DEPENDABLE DURENE—
IN MERCHANDISE THAT MOVES



Vest and shorts of durene mesh in appealing pastel colors — from Carl Gutmann and Co., Inc. . . . The sheer durene stockings are from The Blenheim Silk Hosiery Co., Inc.

Soft fine durene, comfortable and durable, makes this boy's underwear—from The Globe Knitting Works . . . Jacob H. Blaetz offers the durene hosiery.

The William Carter Company features this durene union suit . . . The Melrose Hosiery Company produces the durene hosiery.

One standard, one quality, one clear straightforward track for getting your durene numbers quickly into the hands of consumers — that's what durene licensees are assured of . . . For the uniform excellence of durene yarn is steadily maintained by the Durene Association of America, which also offers you styling counsel, and advertising and sales help unparalleled in the textile field.

National advertising is continuously telling retailers and shoppers that durene, the finest mercerized cotton yarn, is "softer, more elastic, more absorptive and more durable." Customers are urged to look for the durene label on finest cotton underwear, outerwear and hosiery for men, women and children . . . The Association's contact with individual store buyers has won favorable acceptance of durene-labeled merchandise, and leading stores all over the country now feature it by name.

Perhaps the stimulus of well-styled durene numbers is just what your line needs. Let us tell you more about the cooperation we will gladly give you.

DURENE ASSOCIATION OF AMERICA, 250 FIFTH AVENUE, NEW YORK CITY

Durene

THE FINEST COTTON

QUALITY BEGINS WITH THE YARN

MEMBERS: ABERFOYLE MANUFACTURING CO., Philadelphia, Pa. • AMERICAN YARN AND PROCESSING CO., Mount Holly, N. C. DIXIE MERCERIZING COMPANY, Chattanooga, Tenn. • HAMPTON COMPANY, Easthampton, Mass. • CLARENCE L. MEYERS, INC., Philadelphia, Pa SPINNERS PROCESSING COMPANY, Spindale, N. C. • STANDARD-COOSA-THATCHER COMPANY, Philadelphia, Pa.

Wool

OHIO, PENNSYLVANIA AND WEST VIRGINIA (IN GREASE)

Fine delne..	$0.25 –$0.26	¾ blood....	$0.23½–$0.24½
Fine clthg ..	.20½– .22	½ blood....	.22 – .23
¼ blood.....	.24 – .25		

TEXAS AND CALIFORNIA (CLEAN BASIS)

Texas, 12 months	$0.58 –$0.60
California, Northern	.50 – .52

PULLED—EASTERN (CLEAN BASIS)

A.A.	$0.62 –$0.64	B-Super...	$0.46 –$0.47
A-Super....	.50 – .52	C-Super...	.41 – .42

MONTANA, IDAHO AND WYOMING (CLEAN BASIS)

Staple fine	$0.61 –$0.62
Staple ¾ bld.	.57 – .58
Fine and fine medium	.56 – .58
¾ blood	.50 – .52
½ blood	.45 – .47

MOHAIR—DOMESTIC

Best carding	$0.23 –$0.25
Best combing	.31 – .33

MOHAIR FOREIGN (IN BOND)

Turkey fair, average	$0.17 –$0.20
Cape firsts	.18 – .21

FOREIGN CLOTHING AND COMBING (CLEAN BASIS IN BOND)

Australia:	
70s	$0.53 –$0.55
64s	.46 – .48
58s-60s	.41 – .43
(IN GREASE)	
Montevideo:	
58s-60s	$0.19 –$0.20
56s	.19 – .20
50s	.16 – .17
Buenos Aires:	
4s, 40-44s	$0.14 –$0.15
5s, 36-40s	.12 – .14

FOREIGN CARPET (GREASE BASIS IN BOND)

Aleppo washed	$0.22 –$0.24
China: Combing No. 1	.13 – .14
China Filling Fleece	.12 – .14
Szechuen ass't.	.12 – .14
Cordova	.14 – .15
Scotch black face	.15 – .17
East India: Kandahar	.17 – .19
Vican'r	.23 – .25
Joria	.23 – .24

Worsted Yarns

ENGLISH SYSTEM WEAVING

2-20s 36s	$0.75 –0.77½
2-24s 40s	– .85
2-26s 44s	.87½– .90
2-28s 46s	.92½– .95
2-30s 48s	.95 – .97½
2-32s 50s	.97½–1.00
2-30s, 64s fancy mixes	1.37½–1.45
(Single yarns 5c. less than above)	
2-36s, 58s	$1.17½–1.20
2-40s, 60s	–1.20
2-40s, 64s	1.35 –1.37½
2-50s, 66s	1.40 –1.45
2-60s, 70s	1.82½–1.85

ENGLISH SYSTEM KNITTING

2-20s, 44s in oil	$0.75 –0.77½
2-20s, 48s in oil	– .80
2-20s, 50s in oil	.80 – .82½
2-20s, 56s in oil	.95 – .97½
2-20s, 60s in oil	1.10 –1.12½
2-20s, 64s in oil	1.20 –1.25
1-18s, 48s dyed	.95 – .97½
1-18s, 50s dyed	.95 – .97½
(Oil yarns 17½c. less)	

FRENCH SYSTEM

1-20s, 58s	$1.05 –1.07½
1-20s, 60s	1.10 –1.12½
1-18s, 64s, dyed	1.32½–1.35
1-26s, 64s	1.10 –1.12½
1-30s, 60s, Warp	1.20 –1.22½
1-30s, 64s, Warp	1.22½–1.25
2-30s, 64s, Fancy mixes	1.45 –1.47½
2-40s, 64s, Zephyrs	1.35 –1.40
1-50s, 66s	1.47½–1.52½
2-50s, 66s	1.50 –1.55
1-60s, 70s	1.85 –1.87½
2-60s, 70s	1.90 –1.95

FRENCH SPUN MERINO WHITE

1-30s, 50-50-58s on cops	$ .95 –1.00
1-40s, 50-50-60s on cops	1.10 –1.15
1-40s, 50-50-64s on cops	1.12½–1.15
1-40s, 50-50-64s Australian cops	1.20 –1.25

Underwear mixes, 3 to 5c., Solid color, 35c. additional.

New York Top Futures

	Closed Sept. 16	For the Week High	Low	Closed Sept. 22	Net Change
September	71.00	76.00	70.00	76.00	+5.00
October	71.00	71.00	69.00	69.00	—2.00
November	71.00	71.00	69.00	69.00	—2.00
December	71.00	71.00	69.00	69.00	—2.00
January	71.00	71.30	69.00	69.00	—2.00
February	71.00	71.20	69.00	69.00	—2.00
March	70.20	70.20	68.00	69.00	—1.20
April	70.20	70.20	68.00	69.00	—1.20
May	70.00	70.20	67.50	69.00	—1.00
June	70.00	70.00	68.00	69.00	—1.00
July	70.00	70.00	67.40	68.50	—1.50
August	70.00	70.00	67.50	68.50	—1.50

Tops and Noils

TOPS—BOSTON

Fine (64-66s)	$0.82–$0.85
Half-blood (60-62s)	.78– .80
High ¾ blood (58s)	.70– .72
Aver. ¾ blood (56s)	.63– .65
Low ¾ blood	.60– .62
High ½ blood (50s)	.53– .55
46s S. A. and N. Z.	.51– .53
44s S. A. and N. Z.	.50– .52
40s S. A. and N. Z.	.48– .50

TOPS—BRADFORD, ENG. (SEPT. 19)

Fine (70s)	23 d	¾ bld. (56s)	14 d
Fine (64s)	20 d	½ bld. (50s)	10½d
¾ bld. (60s)	18½d	Cross-bred (46s)	9½d
¾ bld. (58s)	16 d		

NOILS—BOSTON

Fine	$0.36–$0.39	High ½ bld.	$0.29–$0.30
Half-bld.	.34– .36	Low noils	.25– .28
Aver. ¾ bld.	.34– .35	Medium colored	.23– .25
Fine colored	.31– .32		

Wool Substitutes

WOOL WASTE

Lap, fine white	$0.60 –$0.63
Lap, fine colored	.46 – .50
Hard ends, fine white	.48 – .52
Hard ends, ¾ blood white	.33 – .35
Hard ends, fine colored	.22 – .25
Hard ends, medium colored	.15 – .18
Card, fine white	.22 – .25
Burr, fine Carbonizing	.27 – .30

OLD WOOLEN RAGS (GRADED FOR MFRS.)

Merinos, Coarse Light	$0.05 –$0.05½
Merinos, Fine Dark	.03½– .04
Merinos, Fine Light	.10½– .11
Serges, Blue	.05½– .06
Serges, Black	.05½– .06
Serges, Red	.08 – .09
Knit, White	.21 – .22
Knit, red	.10½– .11
Knit, Light Hoods	.11½– .12½
Worsted, Light	.05 – .05½
Worsted, Blue	.05½– .06
Worsted, Black	.06 – .06½

Silk Yarns

THROWN SILK (60 day basis)

	Nominal
Japan organzine, 2 thd. spec. gd. XX. sk. 85%.	$3.80
Japan organzine 2 thd. grand sk. 83%	3.65
Japan organzine, 2 thd. sp. crack. sk. 81%	3.55
Japan crepe, 3 thd. gd. XX bob. 83%	3.60
Japan crepe, 3 thd. sp. crack. bob. 81%	3.50
Japan grenadine, 4 thd. sp. grand singles, 87%	4.90
Japan grenadine 3 thd. 90%	5.70
Canton crepe, 3 and 4 thd. 14/16 on bobbins	2.50
Hosiery tram, 3 thd. Japan 90%	4.70
Hosiery tram, 5 thd. Japan, 85%	3.55
Hosiery tram, crack XX 78%	3.20

SPUN SILK YARNS (Terms: net 30)

40/2	$3.10	60/2	$3.45
54/2	3.30	62/1	2.35

Raw Silk

(60 Day Terms. Spot Goods.)

	13/15 White	20/22 White	20/22 Yellow
Super Grand, 87%	$4.95	$2.50	$2.30
Special Grand, 85%	2.75	2.40	2.25
Grand XX, 83%	2.60	2.35	2.20
Special Crack, 81%	2.50	2.35	2.20
Crack XX, 78%	2.40	2.30	2.15
Extra Extra, 73%	2.35	....	....
Best Extra, 68%	2.30	....	....

Canton filature, new style, 14/16	$1.80
Canton filature, new style, 20/22	1.70
Tussah filature, 8 cocoon	1.05

NATIONAL RAW SILK EXCHANGE

	Closed Sept. 16	For the Week High	Low	Closed Sept. 22	Net Change
September	2.48	2.48	2.30	2.35	—.13
October	2.43	2.45	2.29	2.30	—.13
November	2.40	2.42	2.28	2.31	—.9
December	2.39	2.40	2.24	2.27	—.12
January	2.39	2.41	2.23	2.27	—.12
February	2.39	2.41	2.23	2.26	—.13
March	2.39	2.41	2.23	2.26	—.13
April	2.39	2.40	2.23	2.26	—.13

Total number of bales, 11,450. Total approximate value, $3,807,125. Trading unit crack XX 13/15 white 78%.

Domestic Rayon

VISCOSE PROCESS

Denier	Filament	First	Second
50	14	$2.15	$1.95
75	18–30	1.35	1.25
100	18–40	1.10	1.00
125	36–50	1.00	.90
150	30	.70	.67
150	24–40	.75	.72
150	60	.85	.82
150	75–90	.85	.82
170	24–27	.75	.72
170	60	.85	.82
200	30	.75	.72
200	35–42	.75	.72
300	42–62	.63	.60
450	54–60	.63	.60
600	72–96	.63	.60
900	100–144	.63	.60

NITRO-CELLULOSE PROCESS

Denier	First Qual.	Second Qual.	Denier	First Qual.	Second Qual.
75	$1.35	$1.25	150	$0.75	$0.72
100	1.05	.95	175	.75	.72
125	.95	85			

CUPRAMMONIUM PROCESS

Denier	Filament	Price	Denier	Filament	Price
15	24	$3.10	65	45	$2.00
25	24	2.85	80	60	1.70
30	24	2.60	100	75	1.35
40	30	2.40	120	90	1.22
52	30	2.20	150	112	1.10
			180	135	.97

ACETATE PROCESS

Denier	Price	Denier	Price
45	$1.60	125	$1.10
60	1.50	150	1.00
75	1.40	300	1.00
100	1.30		

Rayon Waste

Open bleached waste	$0.13–$0.14
Open unbleached waste	.10½
Bleached thread waste (mfs.)	.09
Bleached thread waste (misc.)	.06– .07
Colored thread waste	.03– .04
Colored clips	.03– .04

CONVERTED RAYON WASTE

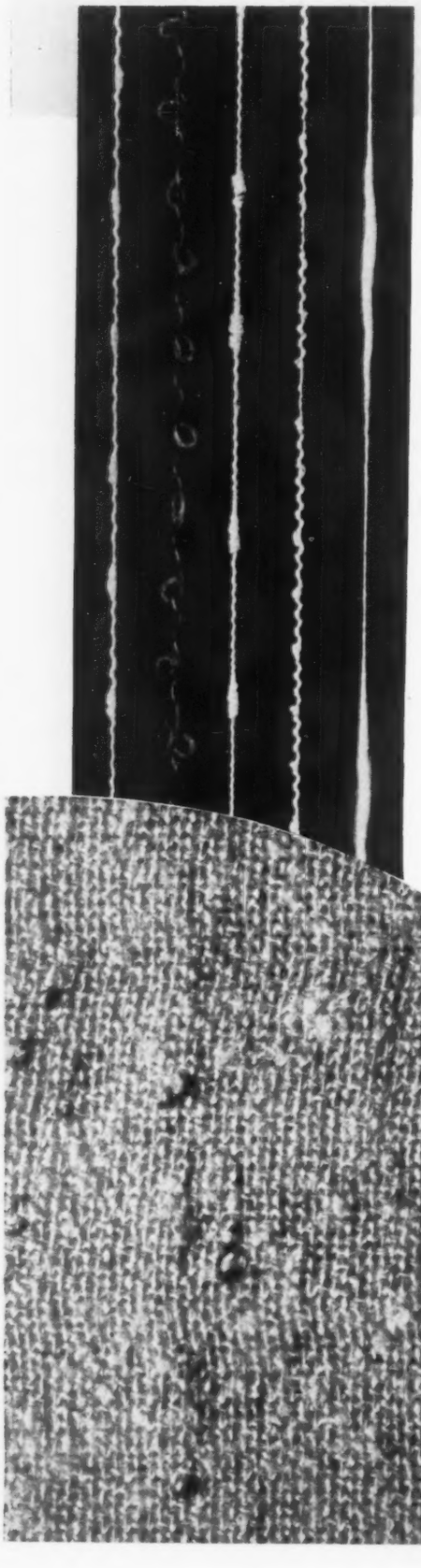
Bleached tops	$0.30–0.32½
Unbleached tops	.27– .28
Bleached noils	.11
Unbleached noils	.09½
Bleached garnetts	.12
Unbleached garnetts	.13
Colored garnetts	.10– .11

Silk Waste

Kibizzo Kakai Grand XX	$0.50
Kibizzo Kakai Triple Extra	.44
Frison Grand Double	.49
Pierced Cocoons	.50

FABRIC NOVELTY

BEGINS WITH THE *Yarns*



. . . because you can tell a clearer story across your desk

" . . . it's hard to get this idea down on paper . . . I wish I could talk it over with you . . . "

There's only one way to tell a spinner about your new ideas for a novelty fabric. And that's to tell him. When you write, something's lost. Your idea doesn't go over the way you'd like it to. And the samples you get from the spinner don't quite do the trick.

That's why Montgomery sends a representative right to your mill, to talk over your novelty fabric with you. He's an experienced spinner. His advice is intelligent. It often saves money on fabric production. And usually results in sample novelty yarns that give you the exact effect you want.

The Montgomery Company
Windsor Locks, Conn.
NEW YORK SALESROOMS - 468 FOURTH AVENUE

NOVELTY YARNS

of Cotton, Worsted, Wool, Mohair, Rayon, Silk, combined into knot, Loop, Spiral, Flake, Ratine effects. Facilities of entire organization available for developing novel effects, for Knitters and Weavers.

TINSEL

Lame, Laminette, Cords, Cordonette, Threads, Brilliants, Perlerett, in Gold, Silver, Antique, Steel. Bare Copper Tinsel Conductor Cord for Electrical Purposes. Copper Mop Yarns. "Kwickscour" Line.

MONTGOMERY
Designers and Spinners of Novelty Yarns

Current Problems Are to Be Featured at N.A.C.M. Annual Meeting

THE business outlook, merchandising, distribution and taxation will be the principal topics for discussion at the annual meeting of the National Association of Cotton Manufacturers in Providence, Oct. 7 and 8.

New officers will be elected and reports of Treasurer Frederick Flather Jr., Secretary Russell T. Fisher and of committees will be read at the opening business session Wednesday afternoon at 5:30 p.m., Oct. 7, in the Rhode Island Country Club. Preceding this session there will be a golf tournament open to members and guests. Prizes will be awarded for the best gross and net score and for each eagle turned in and these will be presented at the informal dinner to be held at the country club at 7 o'clock in the evening.

The influence of the changing customer demands on mills and distributors will be discussed by Ray Kramer, fashion authority, at the Thursday morning meeting in the Providence Biltmore Hotel. At this meeting Alexander Storyk, one of the leading dress manufacturers of the country, will speak of the advantages of a closer understanding between the cutting trade and the mills.

"The Business Outlook" will be the subject of an address Thursday afternoon by Elliott S. Boardman of the Federal Reserve Bank of Boston. Henry F. Long, Massachusetts Commissioner of Taxes, will discuss taxation. The convention will be brought to a close with the annual dinner at 7 p.m.

▸ Schedule for N.A.C.M. Textile Forum Series

The Textile Forum of the National Association of Cotton Manufacturers will hold its first session of the 1931-32 season Thursday, Oct. 22, in the Boston Chamber of Commerce building. At that time superintendents and agents from cotton mills of New England, New York and Pennsylvania will assemble to discuss problems confronting the industry.

Representatives of the machinery manufacturers, dyestuffs and other mill supplies will be invited to the meetings this year, in order that during the discussions when any of their products are under consideration they can give information which otherwise might not be available.

The schedule of meetings as arranged by the steering committee follows: Oct. 22, agents, managers and superintendents; Nov. 12, overseers of carding; Dec. 10, overseers of spinning; Jan. 14, master mechanics; Feb. 11, overseers of warp preparation and weavers; March 10, overseers of dyeing, bleaching and clothroom.

Chairmen of the various sessions will be selected from overseers recommended when the superintendents meet. The program for the opening meeting will be arranged by the committee at its meeting on Oct. 8 when the N.A.C.M. holds its annual convention at Providence, R. I.

▸ Hosiery Association To Study Wearability

A study of the wearing quality of hosiery will be undertaken by the Natioal Association of Hosiery & Underwear Manufacturers, it is announced by Louis Richard Keeffe, acting secretary.

The study will be under the direction of the Association's research division at the Bureau of Standards, Washington, and is planned to include both men's and women's hosiery. Tentative plans, including the development of a new machine to make the tests, have been prepared.

▸ Rayon Imports for August

The Department of Commerce reports imports of rayon and other synthetic textile fibers into the United States during August, 1931, as follows:

	Pounds	Dollars
Yarns		
France	12,067	9,515
Germany	46,633	34,168
Italy	21,118	13,575
Switzerland	660	655
United Kingdom	1,200	1,639
Netherlands	48,190	26,428
	129,868	85,991
Spun Yarn and Thread		
Switzerland	1,866	2,285
France	282	262
Germany	2	4
	2,150	2,551
Filaments, including artificial horsehair		
Germany	6,604	7,074
Switzerland	220	308
Belgium	330	463
	7,154	7,845
Waste		
France	223	144
Italy	22,758	2,335
Germany	153,707	16,654
Netherlands	245	75
Japan	18,000	1,384
	194,933	20,592
Cut or staple fiber		
Switzerland	1,350	384
Italy	61,700	17,913
United Kingdom	30,000	16,903
Germany	66,775	23,363
	159,825	58,563

▸ Indian Orchard Co. Offers New "Boroda" Yarn

Indian Orchard (Mass.) Co. offers a new type "Boroda" yarn which is a combination of "Shara" spun rayon yarn with worsted flake. It is a 3,200-yard flake yarn which permits cross-dyeing and is offered for use for outer knitwear, draperies, bedspreads and men's and women's sportswear.

▸ Bradford Durfee School Opens With Large Class

Day sessions of the Bradford Durfee Textile School, Fall River, Mass., have begun with 69 students, one of the largest classes in the history of the institution. Enrollment for the night classes, is also large.

National Wool Week Begins Nov. 9

The week beginning Monday, Nov. 9, was selected as the periqd for "National Wool Week" at a meeting of a nominating committee representing various branches of the woolen and wool products trades at the Manhattan Club on Sept. 17. Col. Charles F. H. Johnson, who had been named as temporary chairman of the Wool Week Committee at a preliminary organization meeting in Washington last month, was unanimously chosen as permanent chairman of the committee that will direct the promotional campaign.

The following were named as vice-chairmen: Leo A. Del Monte, president, Industrial Council of Cloak, Suit and Skirt Manufacturers; Thurmond Chatham, president, Wool Blanket Manufacturers Association; William P. Goldman, president, Clothing Manufacturers Research Board; Lewis S. Hird, of Samuel Hird & Sons, woolen manufacturers.

A representative of the retailers will be named as a vice-chairman shortly.

▸ Proposed India Rayon Plant

An annual rayon yarn production of 5,600,000 lb. is projected by the Swadeshi Rayon Silk Mills, Ltd., in its proposed rayon producing plant at Mysore, India. There is uncertainty as to whether the Mysore Government has approved the undertaking; according to some reports the concession has been obtained by English interests.

▸ Boston Wool Receipts

Reports of domestic and foreign wools at Boston, also imports at Philadelphia and New York for the week ended Sept. 19, based upon data compiled by the Department of Agriculture, follow:

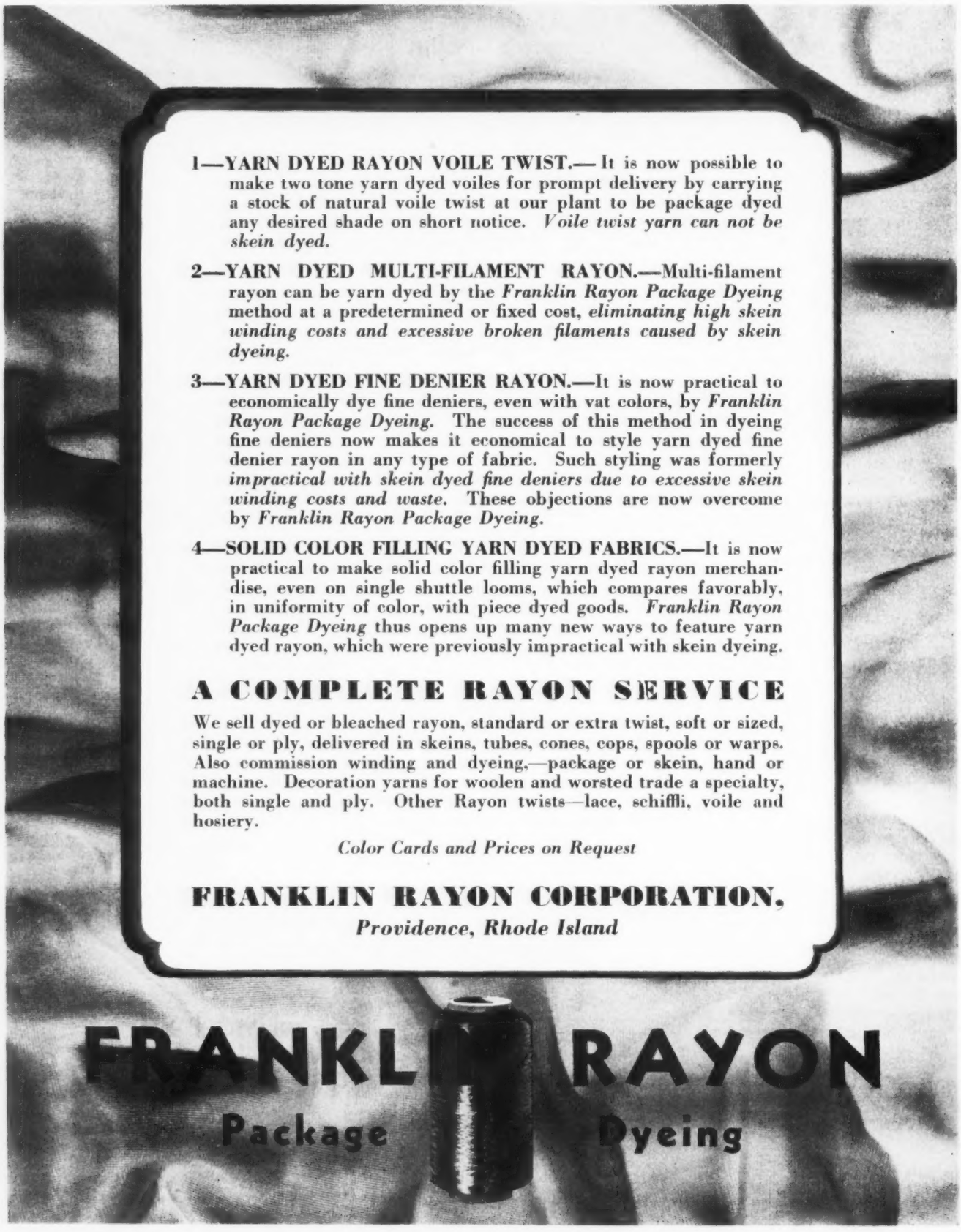
	Week Ended Sept. 19	Total to Date 1931	Total to Date 1930
Domestic	3,073,000	236,367,000	222,790,000
Foreign	370,000	32,067,000	49,326,000
Total	3,443,000	268,434,000	272,116,000
IMPORTS AT PRINCIPAL PORTS			
Boston	370,000	32,067,000	49,326,000
Philadelphia	1,579,000	40,004,000	36,067,000
New York	2,005,000	38,207,000	32,929,000
Total	3,954,000	110,278,000	118,322,000

▸ Boston Stock Auctions

The following sales of textile shares were made at the Boston auction, Wednesday, Sept. 16:

Shares	Mill	Par	Price	Change
22	Pepperell	100	65½	—½
20	Lancaster, com.		$1 lot	
25	Naumkeag	100	56	—9
15	Plymouth Cordage	100	66	—1
19	Hamilton Woolen	100	56	+16
10	Arlington	100	23	—1½
111	Total			

FRANKLIN RAYON PACKAGE DYEING
Now Makes Practical . . .



1—YARN DYED RAYON VOILE TWIST.— It is now possible to make two tone yarn dyed voiles for prompt delivery by carrying a stock of natural voile twist at our plant to be package dyed any desired shade on short notice. *Voile twist yarn can not be skein dyed.*

2—YARN DYED MULTI-FILAMENT RAYON.—Multi-filament rayon can be yarn dyed by the *Franklin Rayon Package Dyeing* method at a predetermined or fixed cost, *eliminating high skein winding costs and excessive broken filaments caused by skein dyeing.*

3—YARN DYED FINE DENIER RAYON.—It is now practical to economically dye fine deniers, even with vat colors, by *Franklin Rayon Package Dyeing.* The success of this method in dyeing fine deniers now makes it economical to style yarn dyed fine denier rayon in any type of fabric. Such styling was formerly *impractical with skein dyed fine deniers due to excessive skein winding costs and waste.* These objections are now overcome by *Franklin Rayon Package Dyeing.*

4—SOLID COLOR FILLING YARN DYED FABRICS.—It is now practical to make solid color filling yarn dyed rayon merchandise, even on single shuttle looms, which compares favorably, in uniformity of color, with piece dyed goods. *Franklin Rayon Package Dyeing* thus opens up many new ways to feature yarn dyed rayon, which were previously impractical with skein dyeing.

A COMPLETE RAYON SERVICE

We sell dyed or bleached rayon, standard or extra twist, soft or sized, single or ply, delivered in skeins, tubes, cones, cops, spools or warps. Also commission winding and dyeing,—package or skein, hand or machine. Decoration yarns for woolen and worsted trade a specialty, both single and ply. Other Rayon twists—lace, schiffli, voile and hosiery.

Color Cards and Prices on Request

FRANKLIN RAYON CORPORATION,
Providence, Rhode Island

▸ Paterson Silk Strike Nearing Its End

The Paterson (N. J.) silk strike seems to be nearing its end. The amalgamated A. F. of L. unions announced this week that over 130 shops, employing about 4,000 workers have made settlements. The majority of these shops are handling plain goods, but a few of them include the jacquard workers. The general strike committee announced that it was forming an "eight-hour patrol" to insure the eight hour day for these workers.

It has been reported that some of the plants are working more than eight hours, in one shift, the aim being to let workers add to their wages. Reports say that some employers are already violating the wage demand agreed on in settlements.

▸ Committee D-13 to Meet in Washington

The fall meeting of Committee D-13 of the American Society for Testing Materials will be held in Washington, D. C., Thursday and Friday, Oct. 15 and 16. The tentative program calls for subcommittee meetings Thursday morning and afternoon, with a luncheon at the Bureau of Standards, and a banquet in the evening. Friday morning, the general session of the Committee will commence; luncheon will be held at the Bureau of Standards, and in the afternoon there will be a continuation of the general session and also sightseeing trips.

The hotel headquarters will be announced shortly. Meanwhile requests for hotel reservations should be sent to Dr. Lyster H. Dewey, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.

▸ New Waldorf in N. Y. Decorated With Rayon

The new Waldorf-Astoria Hotel which opens in New York Oct. 1, illustrates the importance of rayon in the ultra-modern decorative plan. According to a statement by the DuPont Style Service, this hotel uses rayon for a wide range of utilitarian and drapery purposes. Rayon fabrics include: bedspreads, screens, drapes, shower curtains. Many rayon satins are used for decoration, as are red and gold rayon damask. More than 62,000 yards of rayon fabric made from DuPont rayon are used.

▸ Mill Men, Brokers, Converters to Hold Get-Together Dinner

The Textile Brokers' Association is holding a get-together dinner at the Hotel Pennsylvania, New York, on Sept. 29.

Speakers on the evening's program are Leavelle McCampbell, of McCampbell & Co., and president of the Association of Cotton Textile Merchants of New York; Henry Lauten, of Prince Lauten Corp., and chairman of the board of the Textile Converters' Association, and Malcolm G. Chase, director of Berkshire Fine Spinning Associates, Inc.

Invitations to attend have been sent to the members of the Textile Brokers' Association, the Association of Cotton Textile Merchants of New York, the Textile Converters' Association, the Cotton-Textile Institute and to New England mill men.

▸ Institute Favors Net Weight. Cotton-Wrapped Cotton Bales

At a meeting of the executive committee of the Cotton-Textile Institute, held in this city on Thursday evening of last week, the following resolution was unanimously adopted:

Whereas increases in the consumption of cotton through wider use of its products is the greatest service that can be rendered to the cotton farmer; and

Whereas the use of cotton cloth for covering cotton bales will provide (1) a new market for over 200,000 bales annually; (2) additional employment for thousands of people in the cotton mills manufacturing the material; and (3) readier acceptance of American cotton in foreign markets; and

Whereas the present custom of selling raw cotton by gross weight is opposed to good commercial practices and operates to defeat the gain of these great benefits to the farmers, the mills and their employees and to the public at large; and

Whereas the practicability of using cotton baling material has been demonstrated by experience:

Be it resolved that the Executive Committee of The Cotton-Textile Institute recommends that its members use their full influence in effecting the establishment of a net weight basis in the sale of raw cotton.

▸ Evening Course on Textiles by James Chittick

A textile course covering silks, cottons, rayons, woolens, linens, pile fabrics, etc., is announced by James Chittick, consulting textile specialist, who has held these classes for many years. The instruction covers the entire field, from raw materials to finished goods, and previous experience is not a requisite.

The instruction is given each Tuesday evening, at the offices of Mr. Chittick, 45 East 17th Street, New York, from 6 to 8 p.m. The course begins Oct. 6, and there are 16 sessions.

▸ Producers Aim to Curb Weighting Rayon Underwear

Rayon producers are giving increasing attention to the need of curbing the practice of weighting rayon underwear fabrics, and the question was scheduled to be discussed at a meeting this week at the offices of the Better Fabrics Testing Bureau, in New York.

Business News

Cox & Fuller Succeeds Cox, Fuller & Mauersberger

James W. Cox, Jr., and George Fuller announce that the partnership formerly carried out by them under the name of Cox, Fuller & Mauersberger will be conducted hereafter under the name of Cox & Fuller, consulting textile specialists, New York.

Benjamin Booth Moves to Larger Quarters

Benjamin Booth Co. announce the removal of office and plant to new and larger quarters at Allegheny Avenue and Janney Street, Philadelphia, Pa., effective Oct. 1. The company manufactures card clothing, napper wire and tiger wire.

P. N. Thorpe to Operate Own Company

Philip N. Thorpe, who has been general sales manager of the Atwood Machine Co. since 1929, resigned that position, effective Sept. 15. He is now identified with P. N. Thorpe & Co., electrical engineers, 267 Fifth Avenue, New York. Mr. Thorpe's work has brought him in close association with the textile industry over a period of 35 years.

Sales Manager Resigns

Tom Frusher, Jr., has recently resigned as sales manager of Whitin Kohorn Co., Inc.; also as manager of the rayon division of Whitin Machine Works. He will retire to his home at Groton, Conn., for a vacation and rest before announcing his plans for the future.

W. J. McDonough Joins Staff of Northern Equipment Co.

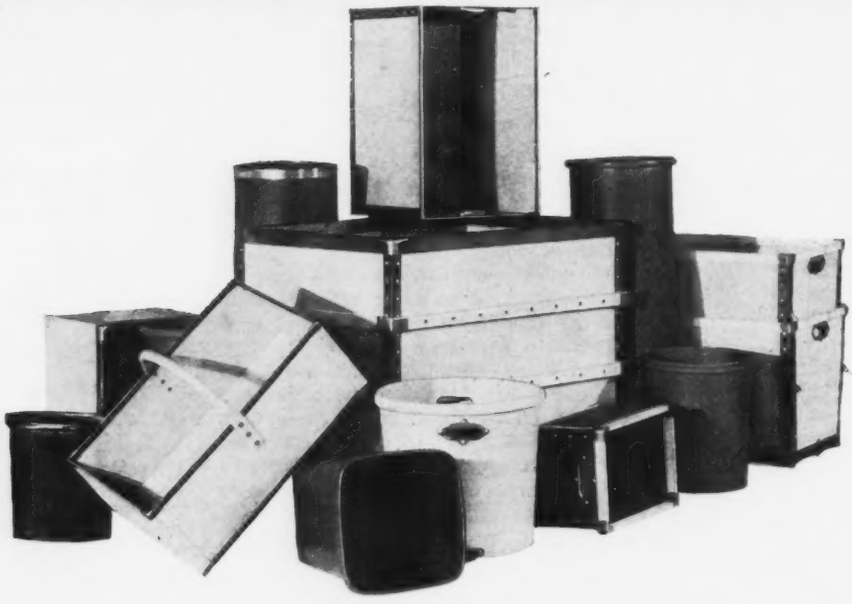
W. J. McDonough has joined the engineering staff of Northern Equipment Co., Erie, Pa., manufacturers of Copes feed water regulators and allied equipment. Mr. McDonough from 1925 to 1927 was affiliated with Northern Equipment as a field engineer and since that time has been connected with Kissick-Fenno Co., New York, in a sales capacity.

Hartmann Reports Good Sales During August

The Hartmann Textile Machine Works, Chemnitz, Germany, in a report covering the month of August, notes the closing of a contract with a woolen mill in Japan, which includes, besides picking machinery, 19 sets of woolen cards and 26 differential wool spinning mules. Additional contracts received from mills in other parts of the world cover 5 sets of cards and 15 wool spinning mules in addition to looms and other equipment.

H. H. Leonard, New York, American agent for the Hartmann concern and others, reports an upward trend of business, in line with the above report.

FIBRE for RECEPTACLES



and for many other purposes—

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1213 W. 3rd St.
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Los Angeles, Calif.
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65 First St.
San Francisco, Calif.
367 Ninth St.
Seattle, Wash.
1714 First Ave. South
Spokane, Wash.
110 So. Cedar St.
Vancouver, B. C.
500 Beatty St.
New Orleans, La.
708-10 Girod St.
Kansas City, Mo.
1336 Oak St.
Fort Wayne, Ind.
LI Sheridan Apts.
Milwaukee, Wis.
1023 No. Broadway
Minneapolis, Minn.
1004 Marquette Ave.
606 Plymouth Bldg.
University City, Mo.
7331 Stanford St.
Spartanburg, S. C.
Golding & Main Sts.
Buffalo, N. Y.
715 Amherst St.
Detroit, Mich.
425 Insurance Exchange Bldg.
Erie, Pa.
426 Liberty St.
Pittsburgh, Pa.
338 No. Craig St.
Toledo, Ohio
419 Board of Trade Bldg.
Boston, Mass.
131 State St.
Philadelphia, Pa.
822 Drexel Bldg.
Hartford, Conn.
750 Main St.

In Canada

Diamond State Fibre Co. of Canada, Ltd.
350 Eastern Ave., Toronto
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THOUSANDS of manufacturers in more than fifty industries use hundreds of thousands of Diamond Fibre Receptacles for material handling purposes. More than five hundred mills in the textile field use these Receptacles in many different forms and sizes.

Why?

Because satisfactory service is built into Diamond Fibre Receptacles. Because there's 100 cents worth of rugged value for every dollar invested in them. Because they are correctly designed; built in a factory devoted exclusively to this product by experienced labor; assembled with the best materials that have been devised for the purpose.

You can make no mistake when you buy Diamond Fibre Receptacles. There's a complete catalog—shows the many types—send for a copy.

CONTINENTAL-DIAMOND FIBRE COMPANY
Manufacturers of Dilecto—Diamond Fibre—Celoron
NEWARK, DELAWARE

Some Textile Fibre parts made by users of Diamond Fibre.